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## United We Stand, But — —

**I**F there was ever a time in history that it behooved the United States to be united, it is now. For in these days of international jockeying for position, who is going to pay attention to or have respect for a Disunited States of America? And we are fast underway to earn that title.

It is true that Germany and Japan gambled upon this same spirit of disunity in this country when they declared war upon us. But that declaration, emphasized particularly by the sneak attack on Pearl Harbor, did away very largely, but apparently quite temporarily, with those differences that our enemies calculated would keep us inept.

The motivation of war united us sufficiently to enable us to win it. But why win it if we are to permit that victory to dissolve into defeat in the maintenance of peace?

Today the United States is rapidly approaching a state of civil war. Not an armed war in which people shoot each other with guns or destroy communities with atomic and other bombs, but a war between employers and employed in which reason is discarded, prejudices promoted, antagonisms augmented and no holds barred.

And over what? Over a dispute as to who shall get what share of something that as yet does not exist, namely the fruits of postwar enterprise.

Who knows yet what they will be or can be made to be? All we know is what we hope they may be if all of us get together to make them what we think they can be.

But any man or woman with a grain of sense, regardless of station in life, should know what they won't be if we indulge in the expensive game of neglecting work to fight over possibilities instead of getting together to work constructively for actualities. You cannot build a better future from idle plants, idle machines, idle men and women, stagnating business, loss of wages and vanished profits.

Somebody apparently has dropped an atomic bomb squarely upon the forthcoming management-labor peace conference. How much better it would have been to wait perhaps 60 days to see whether a formula could be evolved that would settle these matters without the deplorable cost of internecine warfare.

And they could be settled by reasonable men in a reasonable way.

Any reasonable employer will admit that it is to the best interest of business to pay the highest possible wages consistent with keeping industry and business solvent, providing the money for expansion and paying the cost of capital.

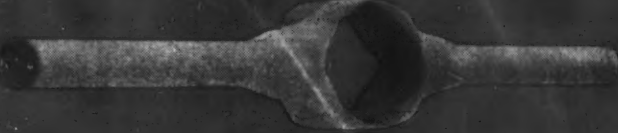
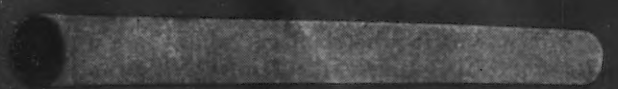
Any reasonable worker will admit that marking pay envelopes up at the expense of a higher price level not only gets him nothing but detracts from what he has. For every cent by which you cheapen the dollar through this method is a cent less in the value of labor's saving in war bonds, cash in the bank and insurance.

Reasonable men should be able to get together and agree on these things in five minutes.

Small wonder, is it not, in the face of evidence that we cannot get together, that our weight at the international conference table is nil? For why should a nation expect to participate in reconciling differences abroad when it cannot settle those at home?

*John H. Lippett*

Inland plates, 17 1/2" x 68" x .233" thick, are rolled, formed and forged into truck housings in three successive steps.



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It takes uniform high quality steel to make truck housings this modern Clark way. That is why Inland steel was chosen—steel that is controlled step by step, from ore mines to finished product, by skilled technicians who daily make hundreds of tests and inspections. This job of checking and rechecking is so thorough that you can always depend on Inland Steel.

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# INLAND STEEL

► Magnesium casting design and production now involves the use of cast iron inserts for bearing faces on functional parts. Gray iron inserts are separately cast and magnesium poured around them.

Experimental work is in progress on the use of bronze inserts in a similar manner, which would greatly broaden the use of magnesium parts. Magnesium wheels are in production for a major manufacturer of heavy duty trucks.

Prices of magnesium castings continue on the steep downgrade slide started during the war. Average price of magnesium alloy castings produced by a Chicago foundry was \$2.50 lb. 18 months ago; \$1.70 lb. Aug. 1, 1945; and is still dropping. Some sell today for as low as 55c. lb.

► A Detroit firm has developed an auto jack which locks onto the brake drum on the inside, consisting of an arm that drops down, which will support a two ton weight.

When the driver has a flat tire, he simply drops the arm and drives up onto it. Current rumor is that Ford will use it.

► Some refrigerator people think more plastics will be used on postwar models than in the past. Generally they are not sold on the use of Mg and Al in place of large quantities of steel, although they consider this substitution to be a possibility.

One firm has been subjected to an intensive sales campaign by a light metals firm to replace steel sheets, but so far the cost factor has withheld any action.

► Boron additions to steel are no cureall for improper steelmaking practices, a Bureau of Mines investigation shows. Generally, boron is most valuable in medium-carbon steels because carbon steels have sufficient innate hardenability and low carbon steels are not intended to be hardened by quenching.

► Castings of aluminum alloys 40E, 195 and 356 having bare, cadmium plated or zinc plated cast iron inserts can be made corrosion resistant with the Alrok treatment without the necessity of masking the inserts.

Since the Alrok treatment is not electrolytic, but a chemical dip process, inserts need not be masked to prevent shorting.

► The auto workers union has submitted a proposal to two parts manufacturers that they grant the 30 pct pay rise, and in return the union will waive any claim to overtime premium pay. To waive, the union demand a guaranteed annual wage, so the proposal calls for 50 weeks of work for employees of five or more years seniority.

This proposal may appeal to some parts firms as their work often piles up into work peaks using much overtime, making their labor costs perennially difficult to predict.

► Jones & Laughlin has eased its coal supply problem during the strike by purchasing sizable quantities of government surplus coal from a closed-down chemical plant. Use of this supply has enabled the firm to maintain its operating rate at about 80 pct of capacity.

► Hearings being held this week by the NLRB in the case of supervisory employees of J & L coal mines will probably establish a pattern for the entire coal industry.

► Current patent listings for a rear engine automobile under the name of Ed Wells, chief engineer of Boeing Aircraft give credence to rumors that the firm will broaden its product line. The firm insists that it will concentrate "primarily on aircraft."

► Against the background of labor disputes, General Motors officials are proud of their reconversion progress. The first Chevrolet is said to have been built at the Kansas City plant within three months of the end of shell production.

► The new Buick models show a new grille stamped in one piece from cold rolled steel. External surfaces are capped with chrome plated stainless steel.

► A new means of fabricating cylinder bores includes a honed finish after boring coating with manganese phosphate. This permits rapid seating of piston rings, and gives protection against scuffing during the early life of the engine.

► "Austerity Peace" is the term Britain uses for its present practice of jumping exports of food and manufactured products to the Continent while shortages at home become far tighter than during the war.

# Maximum Carbon In Carburized Cases

By **SIDNEY BREITBART**  
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... Practical aspects of the author's nucleation theory, that the excessive or normal carbon content of a carburized surface depends on the presence of free carbides in the steel during carburization, are discussed herein. The effects of carburizing medium, carburizing potential, temperature and steel chemistry are described and a method of control of the carburizing process in order to eliminate carburized cases containing excessive carbon contents is indicated.

**T**WO points of view, both supported by experimental evidence, exist on the question of maximum carbon in carburized cases. One view, advanced by McQuaid,<sup>1</sup> Boegehold,<sup>2</sup> and others, claims that the surface carbon content in carburized cases can attain very high values as a normal phenomenon. The other view, advanced by Harris,<sup>3</sup> claims that

<sup>1</sup> H. W. McQuaid, "A Study of the Effect of the Aluminum Addition on the Structures of a Quenched Carbon Steel," Transactions ASM 1937, vol. 25, p. 290.

<sup>2</sup> A. L. Boegehold and C. J. Tobin, "Carburizing Symposium," ASM 1937, p. 79.

<sup>3</sup> F. E. Harris, Metal Progress, April, 1944, p. 683.

the surface carbon content can correspond at most to the saturation value of austenite at the carburizing temperature and that the excessive carbon built up is an abnormal condition.

The apparently contradictory results, on which these two views were based, were shown to fall into line on the basis of a theory advanced by the writer.\* Experimental evidence has

\* Metal Progress, June, 1945.

been presented to show that both excessive and normal carbon contents can be obtained on two sides of the same specimen. This was achieved by keeping two flat specimens of the same steel together for a certain time in the carburizing medium and then by separating them while in the carburizing medium and continuing the carburization. The side which was in contact with the other specimen before being exposed to the carburizing action showed a normal carbon content, while the side exposed to the carburizing action from the very beginning showed high carbon contents. It was considered that the difference in the results on the two sides was due to the fact that the side in contact with the other specimen was fully austenized before being exposed to the carburizing action.

These results, figs 1 and 2, together with an analysis of data presented by other investigators, led to the following theory:

The maximum surface carbon content in carburized cases depends on the microstructure of the steel during the process of carburization. Excessive carbon contents will be obtained in the case when the steel contains

free carbides or carbide nuclei during carburization. Carbon contents called for by the  $A_{cm}$  line, modified according to alloy content, will be obtained when the steel is homogeneous austenite during carburization.

The carburizing medium, *per se*, has no effect on the maximum surface carbon content. Excessive carbon contents may be obtained in pack, liquid or gas carburizing. Pack carburizing, generally requiring a reheat treatment, has the advantage in that in the event of excessive carbon contents, the carbon will exist in its most desirable form (spheroidal carbides). The same argument would, however, apply to liquid or gas carburizing, if the parts were subjected to a reheat and quench operation.

There is one indirect effect which the carburizing medium exercises on the question of maximum carbon content and this effect is related to the ability of the carburizing load to reach the desired temperatures quickly. A slow rate of heating the load will have a greater tendency to produce excessive carbon contents than a rapid rate of heating. The reason for this lies in the more rapid austenization of the steel in furnaces producing high rates of heating. In this respect, liquid carburizing baths have a distinct advantage over the other two methods and are less prone to produce the undesirable condition.

Under general conditions, a very rapid rate of heating is a dangerous practice due to tendency for distortion, but with liquid salt baths, especially of the internal heating type, this danger is very much minimized, due mainly to more uniform heating. The reasons for the more uniform heating are very uniform temperatures within the bath and the method of heating the stock (conduction).

## Carburizing Potential

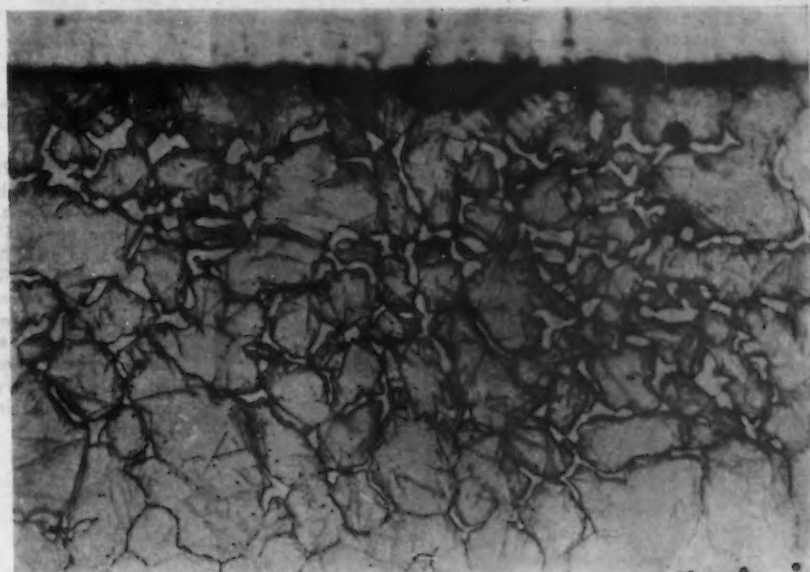
While the method of carburization (solid, liquid or gas) is relatively unimportant with respect to surface carbon content, the carburizing potential\*

\* The carburizing potential is defined as the available carbon for diffusion into the steel and may be considered as the surface carbon content of homogeneous austenite in equilibrium with the carburizing medium at the carburizing temperature.

of the carburizing medium exercises a very important effect on the surface carbon content. In general, the smaller the carburizing potential of the carburizing medium, the less prone is the steel to contain excessive carbon contents. The type of steel under treatment has a definite bearing on

this question. A steel containing stable carbide formers such as Cr, Mo or Va should be carburized in media of relatively low carburizing potentials in order to prevent excessive carbon "built-up" on its surface, since the probability of the presence of carbide particles or nuclei in such steel during the carburizing process is indeed high. A carburizing medium of sufficient potential would most certainly cause an excessive carbon built-up on the surfaces of such steels. Thus the question of carburizing potential is related to the steel used—a medium of high carburizing potential could be satisfactorily used when the steel does not contain sufficient quantities of stable carbide formers and a medium of low carburizing potential must be used when the steel is austenized with difficulty.

The next point to consider is the temperature effect. The higher the temperature of carburizing, the less is the probability of obtaining abnormally high carbon contents on the surface of the carburized case. The reason for this is to be found in the faster austenization rates at higher temperatures. Naturally, it is not recommended that any carburization be conducted above the temperature range of 1700° to 1725°F due to other factors involved, such as the tendency for grain growth and distortion upon quenching. Indeed, as a result of a higher probability of a better quench and less distortion, a better product is obtained when the carburized part is quenched from a lower temperature



**FIG. 1**—Coarse carbides in the microstructure of one side of an SAE 6152 steel specimen exposed to a carburizing gas atmosphere at 1725° F. Etched in 4 pct picral

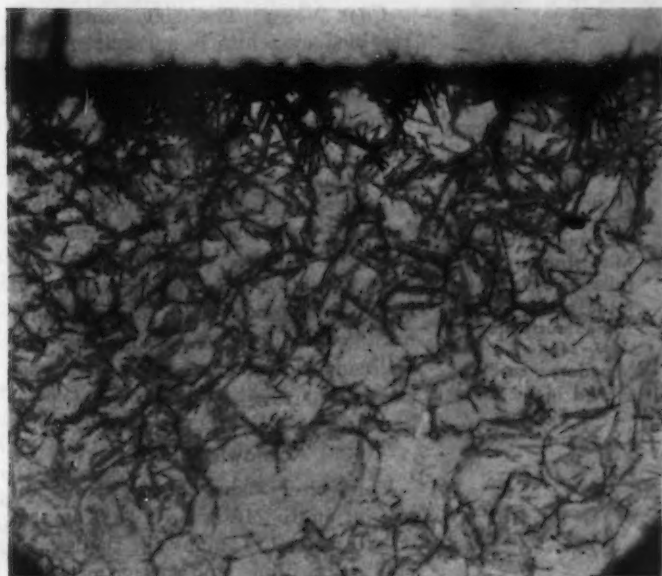
(1550°F). It is for this reason that many heat treaters drop the temperature before quenching or transfer the stock to another furnace held at a lower temperature. Salt baths are ideally suited for the latter method.

#### Grain Boundary Carbides

However, such procedures constitute a dangerous practice inasmuch as grain boundary carbides as well as abnormal surface carbon contents may be obtained. Grain boundary carbides will develop as the temperature is lowered, if the carburizing poten-

tial at the higher temperature is sufficient to produce a surface carbon content above the saturation value of the austenite at the temperature from which the load is quenched; while on the basis of the theory, coarse carbides will develop, in addition to the grain envelopes, if the carburizing potential of the medium at the lower temperature is also high. If the carburizing potential of the secondary medium is very low, the carbon content on the surface will decrease and the grain envelopes will disappear. In this case, however, prolonged immersion in this

**FIG. 2**—No coarse carbides present in the microstructure of the other side of the same specimen as fig. 1. This side was in close contact with another specimen of the same steel for 1½ hr before being exposed to the gas atmosphere. Etched in 4 pct picral.



**FIG. 3**—NE 8720 steel carburized in a carburizing salt bath containing 8 pct CN at 1725° F for 8 hr, transferred to a salt bath containing 6 pct CN at 1550° F and held in this bath for 1½ hr before quenching in oil. Microstructure contains martensite, coarse, free carbides and grain boundary carbides. Etched in picral; at 500 X.



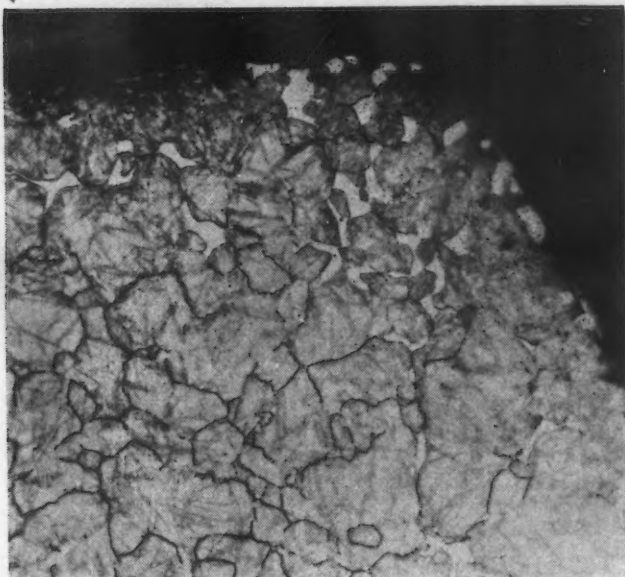


FIG. 4—NE 8720 steel carburized in a continuous gas carburizer at 1725° F for 13 hr and direct quenched in oil. Microstructure contains martensite, retained austenite, coarse, free carbides and grain boundary carbides. Etched in picral; at 500 X.

bath will result in abnormally low carbon contents on the surface. In this respect, this method resembles the diffusion cycle commonly employed. If the potential of the medium at the high temperature is sufficiently low so that no carbides will precipitate out upon the transfer of the stock to the furnace held at the lower temperature, a medium of high carburizing potential may be used in this furnace without the danger of obtaining excessive carbon built-up on the surface of the stock.

The preceding discussion illustrates the complex nature of the inter-relationship among carburizing potential, steel chemistry, temperature and carburizing process. This complexity is, however, a fortunate situation for it, allows numerous methods of correct-

ing or preventing excessive carbon built-ups on the surfaces of carburized parts. A careful examination of the process and the microstructure of the carburized case will indicate the method of solution, provided the investigator will bear in mind that the main point is to prevent the presence of carbide or carbide nuclei during carburizing. It is immaterial whether this is accomplished by prior austenization (preheat in a medium of low carburizing potential), by an increase in carburizing temperature to increase the austenization rate by a change in the carburizing potential, or by direct quenching from the carburizing temperature. Should any method be unsatisfactory for any reason, and coarse, free carbides still persist in the case, a diffusion period in a medi-

um of low carburizing potential (in gas carburizing this may be accomplished in the safe furnace) will eliminate the trouble. Careful control is, however, essential in such cases, otherwise no consistency in the quality of the product will be obtained.

Several examples of actual cases will illustrate the above points and will emphasize the desirability of control of the carburizing process by metallographic examination.

**Case No. 1:** The coarse, "free" carbides, fig. 3, formed as a result of the undesirable combination of sufficiently high carburizing potential of the bath at 1725° F (this caused grain boundary carbides to precipitate when the steel dropped in temperature to that of the 6 pct CN bath) and the comparatively high carburizing potential of the 6 pct CN bath. This condition was overcome by the use of direct quenching from the high temperature bath, which was simultaneously lowered to 1675° F to 1700° F.

**Case No. 2:** The coarse, "free" carbides, fig. 4, are a result of high carburizing potential (high methane content) while the steel was at low temperature in the first part of the furnace. The grain boundary carbides are a result of excessive time elapsing prior to the steel being quenched, causing a drop in temperature with a consequent precipitation of grain boundary carbides. The coarse, free carbides were eliminated by lowering the carburizing potential in the furnace (reduced methane content), while the grain boundary carbides were eliminated by a more rapid immersion of the steel into the quenching oil. The reduction of the carburizing potential also contributed to the elimination of the grain boundary carbides by lowering the carbon content of the case.

**Case No. 3:** The large amount of retained austenite is a result of high carburizing potential, which produces a carbon content near the saturation value of the austenite at that temperature. Such high carbon contents are undesirable due to the high probability of precipitating fine grain boundary carbides upon the transfer of the carburized stock to the quench, in addition to obtaining large amounts of residual austenite with its attendant hardness troubles. This condition was overcome by a further reduction of the carburizing potential.

#### Acknowledgments

The writer wishes to express his appreciation to Messrs. R. S. Komarnitsky and J. J. Tompos for their valuable suggestions and criticism.

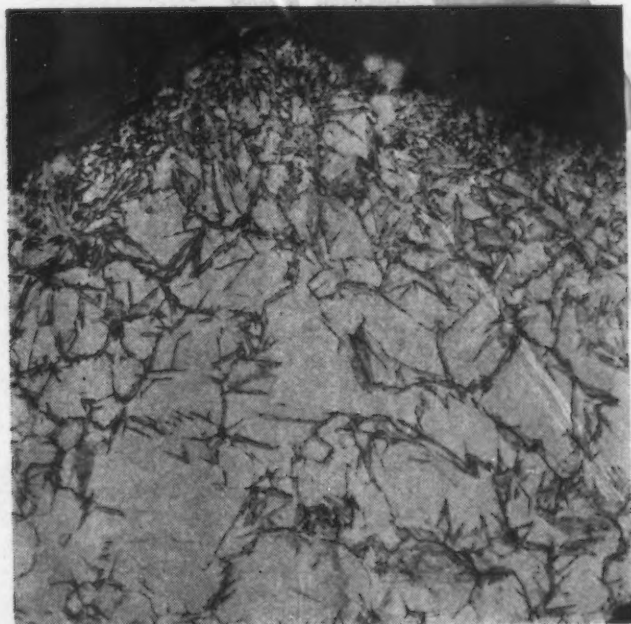


FIG. 5—NE 8720 steel carburized in a continuous gas carburizer at 1725° F for 13 hr and direct quenched in oil. Microstructure contains martensite, large amount of retained austenite and very fine grain boundary carbides. Etched in picral; at 500 X.

# Assembly of Bearings by Sampling Principle

**M**ATCHING for fit of the inner and outer rings of bearings by selected groups has been found to be more rapid and accurate than the customary method of matching by single sets. This has been the experience of the Gwynedd plant of the SKF Industries, Inc., located near Landsdale, Pa.

The core of the new method consists of the operation of taking one inner ring from a group of about ten such rings previously selected by measurement, and matching its fit with an outer ring belonging to a selected group of outers in the same dimensional range variation as the inners. If the operator is satisfied after making a fit test of the sample, she accepts both groups of inners and outers as properly matched, and associates them together by the simple expedient of having a rod which holds the inners slipped into a tube which holds the outers. Thus, there is assurance that the groups remain intact together when passed to the final assembly line. The probability of poor fits occurring in the finished bearing has been greatly reduced even though the job of matching is divided between three girls in place of one who formerly matched an inner with an outer and put them together. Now, one girl measures and groups inners, another girl does the same with outers and a third girl fits them for proper matching. The movement of bearing components through the selective assembly and other sections of the assembly line is continuous and mechanical on the whole.

This procedure of selecting rings is being used on special rocker arm bearings for aircraft engines which are required to oscillate at a rate of 1400 times per min and are subjected to severe radial loads at the same time. The bearing contains a full complement of straight cylindrical rollers at each end and a deep groove ball bearing in the center to absorb the thrust. The looseness of fits of the assembled bearings falls within 13 microns or about 0.0005 in.

Complete temperature and humidity control is held constant throughout the plant, which is windowless. Additional electrical filtering of air in critical areas is also maintained. Of the total manufacturing personnel, 40 per cent are assigned to inspecting and checking duties. Process control and

quality control stations are located at various convenient places throughout the plant. Dimensional limits of some parts are held as close as 25 millionths of an inch and surface finish

as close as 3 millionths of an inch. This is done on a production basis of thousands of bearings. Special lint-free garments are supplied to inspectors and the assemblers.



**FIG. 1**—Grouping inner rings (races) according to variations from nominal race diameter. Determinations are made by means of the metric dial indicator reading in microns. Each rod holds rings that measure within a definite diameter range.



**FIG. 2**—Selection of outer rings according to inside diameter readings on a metric dial indicator. Rings are placed on fiber tubes numbered according to size variations in microns from nominal size. Note boards on which the tubes are mounted. These are shifted on conveyor to the operator who matches groups of inners and outers for proper fit.

# Effects Of Boron In Steel

... A study of the properties imparted to steels by boron additions, undertaken by the Bureau of Mines (Report of Investigations 3816), led to the conclusion that the most important effect of the proper use of boron is to increase the hardenability of steel that is used in the quenched condition without tempering or with only slight tempering. Neither the hardness nor any other property of a steel is materially improved by treatment with boron if the steel is normalized. An abstract of this report is presented herein.

o o o

TO obtain additional information concerning the effects of boron in steel and its method of addition, 119 steels and 16 boron bearing addition agents were studied.

The steels examined in this investigation were made in a 35-kva high-frequency induction furnace. The basic charge for each heat of steel weighed 17 lb and consisted of clean boiler punchings of known analysis plus sufficient wash metal so that the carbon could be caught coming down by means of an ac carbon tester. When the temperature of the bath was proper, 50 pct ferrosilicon was added to deoxidize the metal and to add the silicon necessary to obtain the desired content. Medium-car-

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bon ferromanganese was then added to meet the manganese specification. Any slag present was removed, and the boron addition under study was made to the bare surface of molten steel.

After the boron addition agent had dissolved, the steel was cast into an ingot mold equipped with a hot top. After the ingot was separated from its mold, it was numbered and covered with sand for slow cooling. When a number of ingots had been collected, they were hammer forged into 1½-in. diam bar stock. During forging, liberal portions of the top and bottom sections of the ingots were hot-cropped for discard.

Table I lists the composition of the 16 boron bearing addition agents used

in this investigation. All were obtained from commercial sources except the last three (C, F and G) which were prepared experimentally.

The hardenability of the various boron steels was evaluated by application of the Jominy hardenability test in accordance with the standard procedure developed by the Society of Automotive Engineers<sup>1</sup> and agreed upon by the American Society for Testing Materials<sup>2</sup> and the Steel Standardization Group.<sup>3</sup>

Committee, SAE Standard Procedure Recommended for Testing Hardenability of Steel, SAE Journal, January, 1942, pp. 15-20.

Committee, Tentative Method of End Quench Testing for Hardenability of Steel, ASTM Designation A255-42T, ASTM Standards, pt. 1, 1942, pp. 1106-1112.

Jominy, W. E., Standardization of Hardenability Tests, Metal Progress, December, 1941, pp. 911-914.

The austenitic grain size of the steel at time of quench was determined by comparing the fracture grain size of the martensitic portion of the Jominy bar with a series of P-F grain size standards, whereas the relative cleanliness of the steels was established either metallographic-

TABLE I  
Composition of Commercial Boron, Addition Agents

Agents	Designation	Composition, Pct (Approximate)									
		B	Ti	V	Zr	Al	Si	Mn	C	Others	Fe
Silvaz 3 alloy	Silvaz	0.5	10	10	6	6	37				rem.
Silcaz 3 alloy	Silcaz	0.5	10		4	7	37			10 Ca	rem.
Bortam	Bortam	1.7	17			14	21	22			rem.
Carbortam	Carbortam	1.0	16			1.5	3		7		rem.
Borosil	Borosil	3.5					42				rem.
Titanium-boride	TiB	13	50						14		rem.
Ferrobore	FeB	10.2							.70		rem.
Manganese-boron alloy	MnB	20.8						rem.			rem.
Boron-carbide	BC	78							21		rem.
Fused boron-trioxide glass	B <sub>2</sub> O <sub>3</sub>								.3		rem.
Pyrobor	Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub>									99 B <sub>2</sub> O <sub>3</sub> 100 pct Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub>	rem.
Chromium-boron	CrB	71.2								Cr rem.	rem.
Nickel-boron alloy	NiB	10.7								Ni rem.	rem.
C	C	8.0			11.2				3.2		rem.
F	F	6.5			14.5		15.5		2.8		rem.
G	G	9.8			42.0				2.7		rem.

TABLE II

## Experimental Data

Heat No.	Chemical Analysis, Pct						Boron Addition Agent		Ingot Weight, Lb	Efficiency of Addition <sup>1</sup>	Pct. Soluble B. is of T. B. <sup>2</sup>	Grain Size	J <sub>2</sub> <sup>3</sup>	M. F. Due to Boron <sup>4</sup>
	C	Mn	Si	Boron			Designation	Pct Added						
				Soluble	Insoluble	Total								
1	0.56	1.72	0.59	0.0007	0.0074	0.0081	MnB	0.0100	5		8.8			
2	2.47	1.69	1.78	0.0000	0.0008	0.0008	MnB	0.0010	5		0			
3	1.52	1.13	0.80	0.0000	0.0000	0.0000	MnB	0.0000	5		0			
4	1.08	0.93	0.81	0.0000	0.0012	0.0012	MnB	0.0020	5		0			
5	0.83	1.08	0.85	0.0002	0.0033	0.0035	MnB	0.0050	5		5.7			
6 <sup>5</sup>	0.52	1.73	0.77	0.0013	0.0068	0.0081	FeB	0.0050	5		16.0	8	13	1.25
9	0.36	0.95	0.35	0.0013	0.0028	0.0041	FeB	0.0050	15		31.7	8		
10	1.17	1.25	0.38	0.0010	0.0054	0.0064	FeB	0.0050	15		15.8	8		
11	0.98	1.09	0.35	0.0000	0.0025	0.0025	FeB	0.0025	15		0	8		
12	0.97	1.05	0.44	0.0010	0.0088	0.0108	FeB	0.0100	15		17.0	8		
13	1.62	1.22	0.45	0.0002	0.0081	0.0083	BC	0.0050	15		2.4	8		
14	1.11	1.38	0.32	0.0006	0.0080	0.0086	BC	0.0082	14.5	101.2	7.0	8		
16 <sup>5</sup>	1.50	1.51	0.35	0.0003	0.0036	0.0039	MnB	0.0050	12.7	86.2	7.7	8		
17	1.30	1.44	0.34	0.0002	0.0046	0.0048	MnB	0.0050	14.0	87.7	6.4	8		
18	1.28	1.46	0.34	0.0002	0.0044	0.0046	MnB	0.0050	14.1	86.0	4.4	8		
19	0.99	1.38	0.33	0.0005	0.0046	0.0051	CrB	0.0050	14.8	100.5	9.8	7		
20	1.31	1.45	0.34	0.0004	0.0040	0.0044	CrB	0.0050	14.4	84.6	9.1	6		
21	1.09	1.47	0.34	0.0003	0.0048	0.0051	Na <sub>2</sub> B <sub>2</sub> O <sub>7</sub>	10 g	13.1		5.9	8		
22	1.18	1.43	0.34	0.0003	0.0038	0.0041	Na <sub>2</sub> B <sub>2</sub> O <sub>7</sub>	5 g	13.7		7.3	8		
23	0.88	1.40	0.34	0.0003	0.0120	0.0123	B <sub>2</sub> O <sub>3</sub>	10 g	13.7		2.4	9		
24	1.67	1.39	0.34	0.0000	0.0025	0.0025	TiB	0.0050	13.7	45.7	0	8		
25	0.99	1.85	0.40	0.0002	0.0025	0.0027	TiB	0.0050	11.6	41.8	7.4	9		
26	1.56	1.49	0.38	0.0000	0.0037	0.0037	TiB	0.0050	12.8	63.2	0	8		
27	1.54	1.64	0.38	0.0001	0.0052	0.0053	TiB	0.0050	10.4	73.6	1.9	8		
28	0.73	1.26	0.19	0.0003	0.0020	0.0023	TiB	0.0020	12.3	94.5	13.0	8		
29	0.72	1.30	0.19	0.0003	0.0029	0.0032	TiB	0.0040	14.0	74.7	9.4	8	5.0	1.06
30	0.60	0.84	0.25	0.0013	0.0026	0.0039	TiB	0.0080	15.0	65.0	33.3	8	3.0	1.22
31	0.61	1.03	0.35	0.0020	0.0055	0.0075	TiB	0.0080	11.75	73.5	26.7	8	3.6	1.06
32	0.68	0.97	0.33	0.0008	0.0044	0.0052	TiB	0.0100	13.75	47.6	15.4	8	2.8	0.94
33	0.34	0.95	0.34	0.0008	0.0013	0.0021	FeB	0.0010	9.25	130.0	38.1	7	3.8	1.49
34	0.34	0.75	0.24	0.0008	0.0013	0.0021	FeB	0.0020	12.6	89.3	36.1	8	2.5	1.62
35	0.48	0.70	0.22	0.0006	0.0024	0.0030	FeB	0.0030	11.5	76.7	20.0	8	2.8	1.55
36	0.21	0.61	0.17	0.0022	0.0020	0.0042	FeB	0.0050	14.5	81.3	82.4	8		
37	0.18	0.65	0.28	0.0029	0.0029	0.0058	FeB	0.0070	13.6	75.3	50.0	8		
38	0.37	0.62	0.21	0.0023	0.0031	0.0054	FeB	0.0090	12.5	50.0	42.6	8	1.8	1.96
39	0.53	0.63	0.27	0.0008	0.0017	0.0025	Na <sub>2</sub> B <sub>2</sub> O <sub>7</sub>	2 g	14.0		32.0	8	2.5	1.45
40	0.63	0.63	0.24	0.0014	0.0048	0.0062	Na <sub>2</sub> B <sub>2</sub> O <sub>7</sub>	4 g	13.0		22.6	8	2.5	1.36
41	0.50	0.64	0.25	0.0009	0.0030	0.0039	B <sub>2</sub> O <sub>3</sub>	2 g	13.5		23.0	8	2.6	1.52
42	0.47	0.66	0.23	0.0013	0.0048	0.0061	B <sub>2</sub> O <sub>3</sub>	4 g	13.5		21.3	8	2.5	1.94
43	0.39	0.67	0.23	0.0002	0.0003	0.0005	FeB	0.0005	15.0	100.0	40.0	7.5	2.5	1.99
44	0.48	0.67	0.24	0.0002	0.0006	0.0008	FeB	0.0010	13.25	70.7	25.0	7	2.6	1.40
45	0.41	0.68	0.22	0.0016	0.0008	0.0024	FeB	0.0020	14.25	114.0	66.7	5	3.5	1.51
46	0.38	0.59	0.19	0.0008	0.0024	0.0032	FeB	0.0050	14.75	62.9	25.0	8.5	1.75	1.65
47	0.47	0.63	0.19	0.0015	0.0030	0.0045	FeB	0.0070	16.0	86.6	33.3	8	2.4	1.98
48	0.57	0.67	0.69			0.0051	Silicaz	0.0050	12.9	87.5		8.5	3.4	0.98
49	0.49	0.67	0.31	0.0003	0.0018	0.0021	Bortam	0.0050	14.1	39.5	14.3	8	2.4	1.40
50	0.60	0.67	0.23	0.0018	0.0018	0.0036	Carbortam	0.0050	13.25	63.6	50.0	8	2.3	1.27
51	0.65	0.68	0.35	0.0009	0.0068	0.0075	Borasil	0.0050	13.1	139.0	12.0	8	2.7	1.24
52	0.73	0.90	0.28	0.0007	0.0044	0.0051	CrB	0.0050	7.1	48.4	13.7	8		
53	0.48	0.62	0.24	0.0010	0.0029	0.0039	MnB	0.0050	15.6	81.3	25.6	8	2.3	1.62
54	0.45	0.64	0.54			0.0040	Silicaz	0.0050	14.6	78.0		8	3.7	1.04
55	0.57	0.64	0.23	0.0009	0.0037	0.0046	NiB	0.0050	14.5	76.7	19.6	8	2.25	1.34
56	0.65	0.63	0.24	0.0011	0.0036	0.0047	FeB	0.0050	10.5	65.8	23.4	8	2.3	1.28
57	0.47	0.63	0.33			0.0053	Silicaz	0.0050	15.0	106.0		8	3.2	1.04
58	0.52	0.60	0.36			0.0052	Silicaz	0.0050	14.5	100.0		9	2.9	1.13
59	0.75	0.71	0.26	0.0008	0.0023	0.0031	Bortam	0.0050	12.0	49.6	25.8	8	1.8	0.95
60	0.67	0.63	0.10	0.0008	0.0009	0.0017	Carbortam	0.0050	16.0	36.2	47.0	8	1.8	1.21
61	0.55	0.62	0.25	0.0014	0.0027	0.0041	CrB	0.0050	10.5	87.3	34.1	8	2.2	1.37
62	0.38	0.49	0.15	0.0025	0.0018	0.0043	Borasil	0.0050	14.75	84.7	58.2	8	1.4	1.74
63	0.42	0.65	0.22	0.0007	0.0029	0.0036	MnB	0.0050	15.0	72.0	19.4	8	2.5	1.65
64	0.58	0.66	0.22	0.0009	0.0060	0.0069	BC	0.0050	14.0	80.7	13.0	8	2.0	1.25
65	0.43	0.65	0.39			0.0022	Silicaz	0.0025	15.0	88.0		8.5	1.25	0.96
66	0.53	0.58	0.19	0.0018	0.0034	0.0052	B <sub>2</sub> O <sub>3</sub>	5 g	13.4		34.6	8	2.6	1.06
67	0.52	0.63	0.23	0.0015	0.0055	0.0070	FeB	0.0120	16.0	62.2	21.3	8	2.5	1.90
68	0.64	0.64	0.21	0.0004	0.0077	0.0081	FeB	0.0160	14.6	49.3	4.9	8	2.4	1.33
69	0.58	0.70	0.22	0.0030	0.0110	0.0140	FeB	0.0170	14.3	78.6	22.8	8	2.6	1.36
70	0.56	0.65	0.21	0.0050	0.0120	0.0170	FeB	0.0200	12.6	71.5	29.4	7	2.6	1.35
71	0.59	0.52	0.21	0.0006	0.0008	0.0014	FeB	0.0020	13.6	83.5	43.0	8	2.3	1.06
72	0.52	0.66	0.25	0.0005	0.0016	0.0021	FeB	0.0015	11.1	104.0	23.8	8	2.6	1.48
73	0.64	0.48	0.21	0.0034	0.0035	0.0069	FeB	0.0060	13.4	77.2	49.5	8	2.6	1.71
74	0.69	0.51	0.27	0.0001	0.0004	0.0005	TiB	0.0030	15.0	16.7	25.0	8	2.7	1.54
75	0.70	0.60	0.28	0.0010	0.0034	0.0044	FeB	0.0030	12.0	117.5	22.7	8	2.7	1.36
76	0.57	0.47	0.13	0.0007	0.0002	0.0009	Bortam	0.0030	13.0	26.0	78.0	8	1.9	1.65
77	0.56	0.55	0.23	0.0007	0.0008	0.0017	Carbortam	0.0030	14.8	96.1	41.0	8	2.4	1.96
78	0.61	0.53	0.22	0.0007	0.0027	0.0034	FeB	0.0040	15.4	87.3	20.6	8	2.6	1.62
79	0.61	0.59	0.32	0.0008										

TABLE II—Continued  
Experimental Data—Continued

Heat No.	Chemical Analysis, Pct						Boron Addition Agent		Ingot Weight, Lb	Efficiency of Addition <sup>1</sup>	Pct Soluble B. is of T. B. <sup>2</sup>	Grain Size	J <sub>2</sub> <sup>3</sup>	M. F. Due to Boron <sup>4</sup>
	C	Mn	Si	Boron			Designation	Pct Added						
				Soluble	Insoluble	Total								
101.....	0.63	0.63	0.20	0.0006	0.0010	0.0016	G	0.0050	15.0	32.0	37.5	8	2.1	1.28
102.....	0.64	0.62	0.27	0.0090	0.0150	0.0240	FeB	0.0300	13.5	72.1	37.5	8	10	1.33
103.....	0.61	0.69	0.28	0.0016	0.0042	0.0058	NiB	0.0050	12.75	98.5	27.5	8	2.75	1.82
104.....	0.61	0.60	0.28	0.0003	0.0016	0.0019	TiB	0.0040	15.5	49.2	15.8	8	2.9	1.46
105.....	0.63	0.53	0.24	0.0004	0.0027	0.0031	CrB	0.0050	15.5	64.0	12.9	8	2.25	1.38
106.....	0.60	0.68	0.28	0.0003	0.0034	0.0037	TiB	0.0080	15.5	44.0	8.8	8	2.85	1.37
107.....	0.63	0.67	0.22	0.0005	0.0033	0.0038	Na <sub>2</sub> B <sub>2</sub> O <sub>7</sub>	2 g	15.0	.....	13.2	8	2.7	1.63
108.....	0.52	0.50	0.22	0.0004	0.0003	0.0007	TiB	0.0020	16.5	38.4	57.2	8	2.1	1.25
109.....	0.72	0.64	0.20	0.0021	0.0062	0.0073	B <sub>2</sub> O <sub>3</sub>	4 g	15.0	.....	29.8	8	2.4	1.56
110.....	0.58	0.60	0.21	0.0008	0.0033	0.0041	B <sub>2</sub> O <sub>3</sub>	2 g	15.5	.....	19.5	8	2.7	1.39
111.....	0.61	0.64	0.25	0.0002	0.0015	0.0017	Bortam	0.0030	14.75	55.7	11.8	8	2.6	1.59
112.....	0.59	0.52	0.18	0.0002	0.0008	0.0010	Bortam	0.0050	16.0	21.3	20.0	8	2.3	1.30
113.....	0.55	0.72	0.41	0.0003	0.0007	0.0010	Boroil	0.0030	13.5	39.0	33.3	8	2.9	1.30
114.....	0.62	0.57	0.17	0.0006	0.0017	0.0023	C	0.0050	16.0	49.0	26.1	8	2.6	1.57
115.....	0.61	0.62	0.23	0.0006	0.0020	0.0026	Carbortam	0.0030	15.25	88.5	23.1	8	2.8	1.53
116.....	0.51	0.49	0.25	0.0007	0.0034	0.0041	Boroil	0.0050	15.5	85.0	17.1	8	2.5	1.59
117.....	0.65	0.65	0.49	.....	.....	.....	Silcaz	0.0050	14.2	72.0	.....	8	3.3	1.15
118.....	0.74	0.60	0.39	.....	.....	.....	Silvaz	0.0050	14.4	73.0	.....	8	2.6	0.80
119.....	0.58	0.59	0.41	.....	.....	.....	Silcaz	0.0030	15.5	120.0	.....	8	3.7	1.29

<sup>1</sup> Efficiency of boron addition is equal to  $\frac{\text{Pct total boron as found by chemical analysis}}{\text{Pct added boron}} \times 100$  because the boron addition was based upon an ingot weight of 15 lb, which

was seldom obtained.  
Pct soluble boron  $\left( \frac{15}{\text{Actual ingot weight}} \right)$

<sup>2</sup>  $\frac{\text{Pct total boron}}{\text{Pct soluble boron}} \times 100$ .

<sup>3</sup> J<sub>2</sub> is the distance, in sixteenths, along side of Jominy bar from the end-quenched face to the position of 50 pct martensite.

<sup>4</sup> Multiplying factor due to boron as found by calculation.

<sup>5</sup> Heat numbers 6, 7, and 15 were lost.

<sup>6</sup> Envelope containing the boron addition agent was plunged into molten steel bath by means of an iron wire.

<sup>7</sup> The boron addition agent was placed in the end of an iron rod that had been drilled for this purpose. The end of the rod was then closed by an iron plug. When this end was plunged into the steel bath and stirred, it dissolved and thus introduced the boron into the melt.

<sup>8</sup> Carbon too low for standard Jominy hardenability test.

<sup>9</sup> Percentage of boron determined by the distillation method instead of the colorimetric method.

<sup>10</sup> Ingot was hot-short; Jominy bar could not be forged.

ally or by application of the Fitterer electrolytic method for extracting inclusions from steel which was modified somewhat to serve the purpose of this investigation.

### General Observations

Chemical analyses, listed in table II, were made on the fine turnings obtained from the finishing cuts to the Jominy test specimens. Carbon, manganese, silicon were determined by the usual chemical procedure, whereas the boron content was obtained by the Quinalizarine method developed by the Youngstown Sheet & Tube Co. Analyses were made, also, for phosphorus, sulfur, nickel, copper, molybdenum, chromium and vanadium on a number of heats taken at random to establish the presence and percentage variation of these elements as residuals often influence the hardenability to a great extent. In addition, the total aluminum, titanium, vanadium and acid-soluble zirconium were determined for those steels to which these elements had been introduced by various boron bearing addition agents.

Making and shaping of the boron steels presented no particular difficulty. In fact, boron steels could be worked as readily as steels free of

boron. Although previous reports indicated that 0.007 pct boron added to steel produced hotshortness, a heat containing 0.017 pct total boron was forged without difficulty. However, a heat containing 0.024 pct total boron was hotshort, indicating that the change to hotshortness occurred somewhere between 0.017 and 0.024 pct total boron. Similarly, the observation that boron did not coarsen the grain size of the steel is contrary to that of Tisdale and Comstock.\* In addition, it was found that the boron steels were of commercial cleanliness,

\* Tisdale, N. F., "Boron Found to Be a Very Beneficial Alloying Element," *Blast Furnace and Steel Plant*, January, 1943, pp. 93-94.

indicating that none of the boron addition agents were detrimental to the production of quality steel.

The 16 boron addition agents listed in table I were added to plain-carbon steel and their efficiencies were calculated. Efficiency is here used as a quantitative measure of recovery. It equals percent boron recovered according to chemical analysis, divided by percent boron added to the steel, multiplied by 100.

Observations on the relative efficiencies of the boron addition agents

added to melts made in the induction furnace should apply also to heats made in other types of melting furnaces. Actually the various boron addition agents should show greater efficiencies when they are added to open hearth or electric furnace melts, because induction furnace melting, contrary to the general opinion, is oxidizing in character. In the induction furnace used for these experiments the action of the electromagnetic forces on the molten metal caused rapid stirring of the bath; thus a fresh metal surface was constantly subjected to the oxidizing action of the slag and atmosphere.

Early in the investigation it was established that the method of adding the boron agent to the melt was not critical if the bath had been properly killed and cleared of slag previous to the introduction of the boron agent. Therefore, the method used throughout the experimental work, except as noted in the data of table II, was dropping the boron agent on the slag free metal surface. Table II also gives the efficiencies of the various boron agents when added to steel. For convenience they may be listed as shown on the following page.

Addition Agent	No. of Heats	Range of Efficiencies	Average Efficiency
Ferroboreon.....	29	49.3 to 130.0*	79.5
Titanium boride.....	13	16.7 to 94.5*	56.0
Silcaz.....	7	72.9 to 120.0	96.9
Manganese boron alloy.....	7	66.2 to 87.7	73.0
Chromium-boron.....	6	48.4 to 100.5	72.5
Borosil.....	5	84.7 to 139.0	89.7
Bortam.....	5	21.3 to 55.7	38.5
Boron carbide.....	4	80.7 to 119.0	98.0
Silvaz.....	4	73.0 to 106.0	81.1
Carbortam.....	4	36.2 to 88.5	88.8
Nickel-boron alloy.....	3	76.7 to 96.5	49.5
C.....	2	49.0 to 50.0	58.1
F.....	1		32.0
G.....	1		

\* Efficiencies over 100 pct probably are due to homogeneity of the boron addition agent with respect to boron content.

The spread between the maximum and minimum recoveries for a particular boron agent was too great to warrant classifying the agents according to their relative efficiencies. The reason for this spread was that the various addition agents were not homogeneous with respect to chemical composition; furthermore, the amount of addition per heat was small.

From the above, it is important to note that Silcaz and Silvaz, which contain elements other than boron for the express purpose of protecting the boron from oxidation while these agents dissolve in the steel, do have relatively high efficiencies. However, Carbortam and especially Bortam, which also contain such protecting elements show low efficiencies.

It has been observed that elements other than boron present in most of the boron bearing agents will not increase hardenability measurably. However, Silvaz and Silcaz are exceptions. For instance, when 0.005 pct boron is added as Silvaz, 0.10 pct titanium, 0.10 pct vanadium, 0.06 pct zirconium, 0.06 pct aluminum and 0.37 pct silicon are added coincidentally. This silicon supplies part of the total silicon required, and its effect on the hardenability, therefore, is taken into account. Most of the aluminum and zirconium is lost by oxidation, but some of the titanium and vanadium will alloy with the steel and exert an influence on the hardenability. Although the effects of titanium and vanadium on hardenability have not been definitely established, it is believed that the vanadium thus introduced will increase the hardenability, whereas the titanium may decrease it. The same reasoning may be applied to the Silcaz addition, except that vanadium is not present.

Because Silcaz, Silvaz and Borosil contain approximately 40 pct silicon, whereas Bortam contains 21 pct, the final silicon analysis of the melt is likely to be higher than desired, unless this fact is taken into account by the melter.

The investigation showed that ferroboreon was an excellent source of boron, giving the best overall results. Additions of chromium boride or boron carbide did not cause any machining difficulties in the steels investigated in this work. Boron carbide, however, tended to produce an explosive reaction when it was added to the molten steel. Furthermore, it also tended to give poor ingot surface. Titanium boride had a greater tendency to cause the retention of austenite than other sources of boron. It also caused excessive pipe in the ingot. Manganese boron and nickel boron alloys, commonly used to deoxidize nonferrous alloys and improve their physical properties, were found to be satisfactory sources of boron for steel. Additions of Silvaz and Silcaz, as well as titanium boride to a lesser extent, appeared to dissolve with difficulty in the molten steel.

In spite of information to the contrary, both pyrobore (dehydrated borax with formula  $\text{Na}_2\text{B}_4\text{O}_7$ ) and fused boron trioxide glass ( $\text{B}_2\text{O}_3$ ), which are inexpensive, proved to be good sources of boron for steel. It was found that 5 g of pyrobore or 4 g of the trioxide glass would add 0.005 pct (total) boron to the steel (15 lb ingot), whereas 69 g of Silcaz, 77 of Silvaz, 11 g of Borosil or 4.15 g of ferroboreon were necessary to obtain the equivalent boron content. In addition, the quantity of boron obtainable from these two agents did not seem to be limited. For example, in one heat,

10.9 g of the boron-trioxide glass added 0.0123 pct total boron to the steel.

## Conclusions

Although the results were obtained by experimental laboratory work on small induction furnace heats of steel and have not yet been applied to commercial practice, it is believed that they are applicable to commercial size heats.

Boron should be regarded as any other element added to steel to increase the hardenability, and its use should not be expected to be a cure-all for improper steelmaking practice. Generally, boron is most valuable in medium-carbon steels because high-carbon steels have sufficient innate hardenability, whereas low-carbon steels are not intended to be hardened by quenching.

Contrary to general belief, boron may be used to produce fine-grained steels of good forging characteristics. The boron steels examined had good hardenability at low alloy content and were uniform in structure and consistent in behavior.

Regardless of the method of addition to steel, boron has a specific effect on hardenability. In other words, a certain percentage of boron in steel increases the hardenability by a fixed amount. The multiplying factor for the hardenability conferred by boron to steel was determined and found to increase in proportion to the boron content up to a maximum value of 1.58 at 0.003 pct total boron. With further increase in boron content above 0.003 pct, the multiplying factor decreased.

Minute amounts of boron will increase the hardenability of steel comparable to that produced by much larger additions of other more common alloying elements. For instance, it was shown that 0.003 pct total boron in steel has an effect on the hardenability equal to a silicon content of 0.87 pct, a nickel content of 0.79 pct, a chromium content of 0.27 pct, a manganese content of 0.12 pct or a molybdenum content of 0.23 pct. However, it should not be construed that the use of boron will eliminate the usefulness of the more common alloying elements as the increase in hardenability due to the addition of boron is limited; furthermore, properties other than hardenability must of necessity be supplied as formerly by elements other than boron.

# Twin-Motor Drives

## In Hot Reducing Mills . . .

. . . Carnegie-Illinois Steel Corp. has been using twin-motor driven rolls in blooming, slabbing, and reversing plate mills with considerable success and is considering today the installation of such equipment on cold-reducing mills. A description of the development of these mills is contained herein.

**T**HE maximum torque that can be developed at 40 rpm with motors of reasonable size was closely approached with the 8000-hp, single-armature drive installed in the 54-in. blooming mill at Homestead, Pa., in 1925, yet it was apparent still greater power in mill drives was needed. Problems in pinion design increased with the size of the motor, and higher speeds with shorter reversal periods were required to increase mill capacities, particularly in connection with blooming mills. Increasing demands for power presented a problem in the slabbing mill.

When a new installation was considered for South Works, Carnegie-Illinois Steel Corp. engineers in co-operation with those of the motor manufacturer developed, in 1928, the first twin-motor drive used in the steel rolling industry, applying a 5000-hp motor on each roll of a two-high, 54-in. blooming mill. This installation is shown in fig. 1. These are double-armature motors operating at 40 to 80 rpm, having a combined

maximum torque rating of 3,940,000 lb-ft for both rolls, shown in fig. 2. Since then Carnegie-Illinois has installed four similar twin-motor drives as listed in the table. One of the most interesting of these applications is the 160-in. four-high reversing plate mill at the Homestead works where a wide range of widths and gages in both alloys and carbon steels have been successfully rolled (see fig. 3). Mills using large twin-motor drives can be installed for about the same overall cost as the single-motor drive with pinion stand.

These twin-motor drives do not need pinion stands and have several ad-

vantages over the single motor with pinion, among which is a much lower inertia of the rotating parts that greatly facilitates both acceleration and deceleration. The relatively low inertia of the twin motors permits the control to be designed for unusually fast field response without causing high acceleration currents and high reverse power currents thus greatly decreasing maintenance problems. The rapid response of the motors not only makes it possible to increase the entering speed and the rolling speed, but also permits the operator to keep the piece nearer the stand. The combination of these fac-

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Twin-Motor Drives for Hot-Reducing Mills

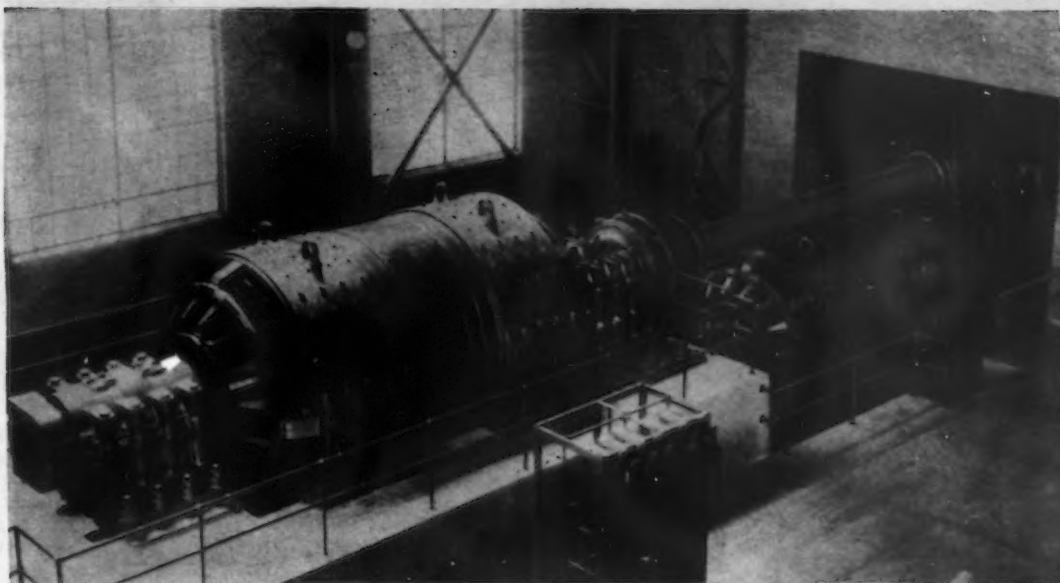
Plant	Date Installed	Size and Type	Edger Motor, Hp	Main Motor, Hp	Speed, Rpm	Voltage	Motor Generator Equipment†	
							Generator Units, Kw	Motor, Hp
South Chicago	1928	54-in. blooming	2500	2-5000(D)*	40-80	700	3-3000	6500 Induction
South Chicago		44-in. slabbing	2500	2-5000(D)*	40-80	600	3-3500	6500 Induction
Edgar Thomson	1937	44-in. slabbing	3000	2-5000(S)*	40-80	700	3-3500	7500 Induction
Homestead	1943	45-in. slabbing	3000	2-5000(S)*	40-80	700	3-3500	7500 Induction
Homestead	1944	160-in. rev. plate	....	2-5000(S)*	40-80	700	3-3000	9000 Induction

† All sets are flywheel units.

\* 100-in. diameter double armature.

\*\* 120-in. diameter single armature.

FIG. 1—This close-up view shows the 10,000-hp twin-motor drive on the 54 in. blooming mill at South Works, Carnegie-Illinois Steel Corp.



tors increases the percentage of time that metal is in the rolls. Speed of reversal is not a problem, as the piece can be entered smoothly at low speed, the power being ample to permit acceleration while the piece is being rolled. Any tendency of either motor to take more than its share of the load strengthens its field and weakens the field of the other, thereby quickly restoring equilibrium.

One of the problems encountered in this type of design arises from the length of connecting spindles required and the maximum angle at which they will transmit the required torque.

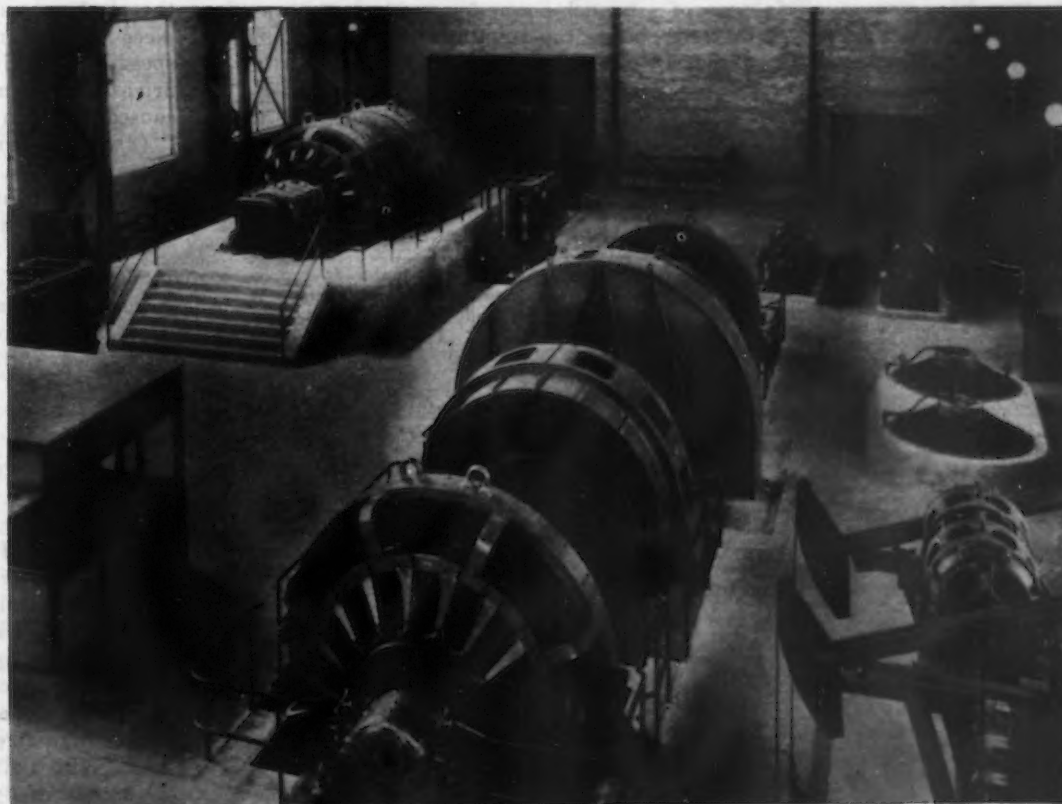
With twin-motor drive, the spindle angle is smallest when the rolls are at about the mid-position, which normally represents the condition for maximum rolling loads. Each of the 5000-hp motors (40 to 80 rpm) on the 160-in. plate at Homestead mill has a maximum torque of 1,800,000 lb.-ft. On the South Chicago mills the torque is 1,970,000 lb.-ft. Fig. 4 shows the maximum spindle angles and other principal dimensions for the twin-motor drives that have been installed in Carnegie-Illinois Steel Corp. plants.

In the initial applications at South Chicago double armatures were used

to hold the spindle angles to a minimum. From experience it was learned, however, that minor changes in the spindle angle offered no serious problems. On the other three installations, therefore, single armature motors have been used. The overall efficiency of both the single and double armature units is about the same. The gain in  $WR^2$  of the double armature units is to a large extent offset by their series operation and end connection losses.

Fig. 5 shows the schematic diagram of connections for a twin-motor drive as applied to the two-high reversing

FIG. 2—This is the motor room of the 54-in. blooming mill at C-I's South Works. The mill drive in the background consists of two 5000-hp, double-armature, 40 to 80-rpm reversing motors. The 9000-kw flywheel motor generator is in the foreground. This is the first installation of twin-motor drive, built in 1928.



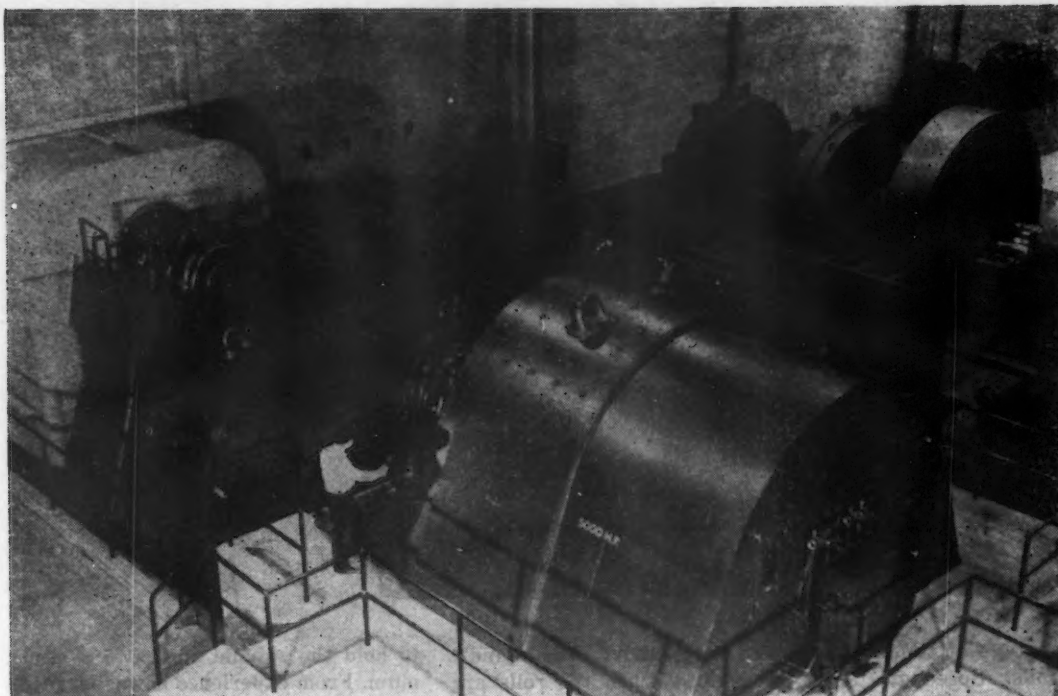


FIG. 3—These two 5000-hp main roll drive motors comprise the first twin-motor drive in the U. S. for a plate mill. Westinghouse reversing motors are installed in the motor room of the 160-in. four-high, reversing plate mill at Homestead works of Carnegie-Illinois. The mill is U. S. Government-owned, but operated by Carnegie-Illinois.

slabbing mill at Homestead. This arrangement includes a 3000-hp motor on the edging rolls which must be controlled in such a manner that when rolling and edging are done simultaneously neither drive will push or pull the other. Electrical connections between the two main drive motors are laid out so as to balance the loads rather than the speeds. This allows different diameters to be used for the top and bottom rolls and still divide the load satisfactorily between the two drive motors. This type of layout uses two pilot series exciters and two load balancing series exciters as indicated in the diagram.

Typical of the motor room setups on the twin-motor drives for the various hot-reducing mills is that of the 45-in. universal slabbing mill at

Homestead. The two large driving units are Westinghouse 5000-hp motors on the main mill stand. A four-unit, 10,500-kw main flywheel motor-generator set (three 5000-kw generators and one 7500-hp driving motor) provides the power, controlled by a 440-v ac distribution switchgear. There is a variable voltage control board for the two 5000-hp twin-drive motors; the three 3500-kw generators; and the 3000-hp edger motor. Control of the 1500-kw generator and feeders that furnish power for the dc motors operating the auxiliary drives is centered in a 250-v dc constant voltage switchboard.

A Precipitron is installed in the make-up air duct of the ventilating system. Fresh air is brought into the system through two ducts. Cooled re-

circulated air is brought into the motor room through several large floor ducts. Electrostatic air cleaning reduces fire hazard from thick layers of dust, reduces wear on the commutators, improves commutation, and insures efficient operation of delicate control mechanisms.

Several advantages are derived from the twin motor type of drive. They are:

(1) There is practically no tendency for the mill to chatter when the steel enters the rolls and the piece can be entered at a higher speed than with a conventional drive. Chatter marks on the plates, caused by worn gears, are absent.

(2) With twin motor drive the phase positions of the rolls can shift independently, thus permitting rapid adjustment to the steel.

(3) The rate of acceleration and deceleration is faster, because of the lower inertia of the motors.

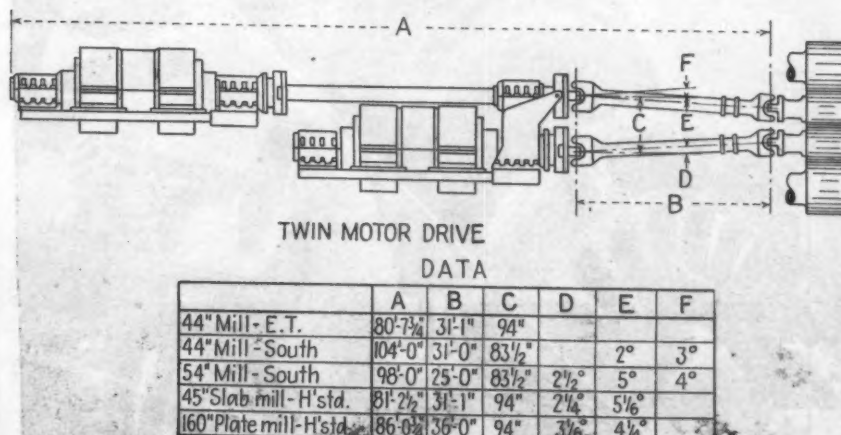
(4) Higher rolling speeds can be maintained with resultant higher tonnages being obtained from the mills.

(5) Backlash is eliminated.

(6) Cost of gear maintenance is reduced.

The twin-motor type of drive on wide hot and cold strip mills offers another advantage in that it eliminates the necessity of accurately matching the work rolls. In either hot or cold mills equipped with a single motor and pinion stand, unless the roll diameters are accurately matched, extremely high stresses are set up in pinions. With twin-motor drives the motor speeds easily and quickly ad-

FIG. 4—The relation of the motors and spindles to the various twin-motor drive mills can be observed from this illustration and the data shown. The spindle angle is smallest when the rolls are at about mid-position, which normally represents the condition for maximum rolling loads.

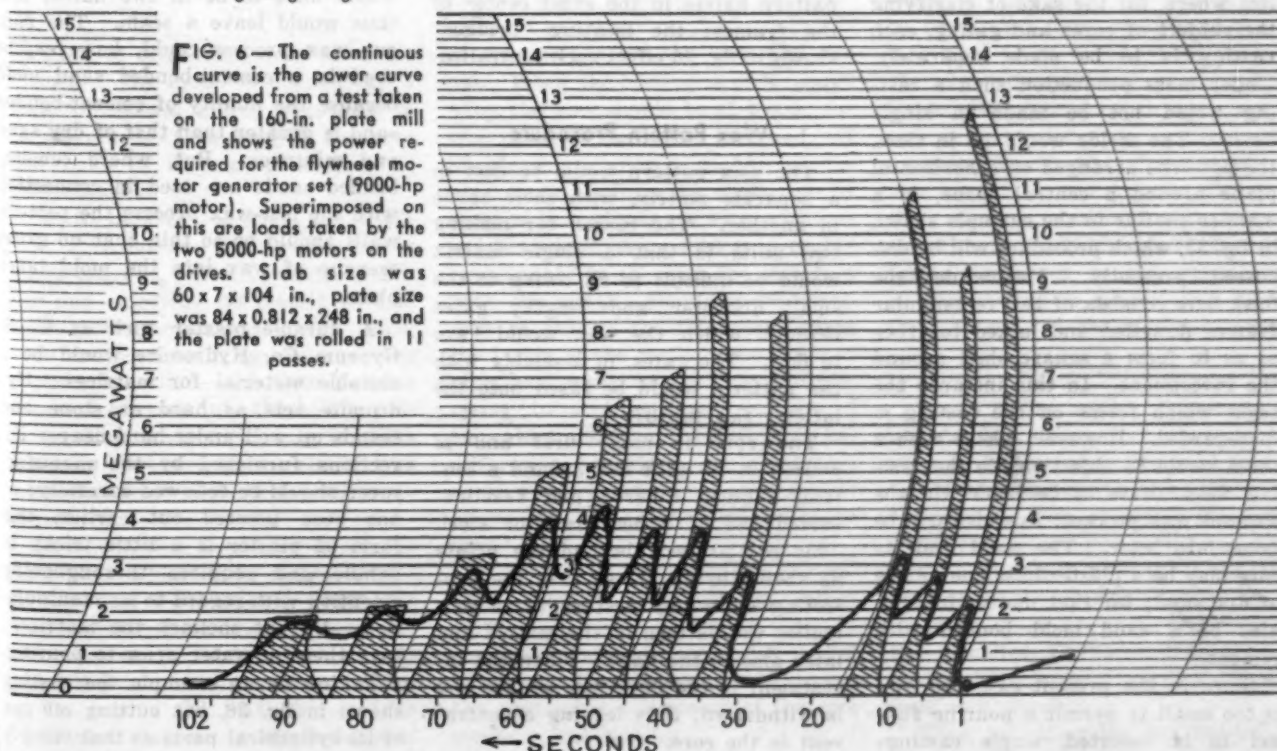
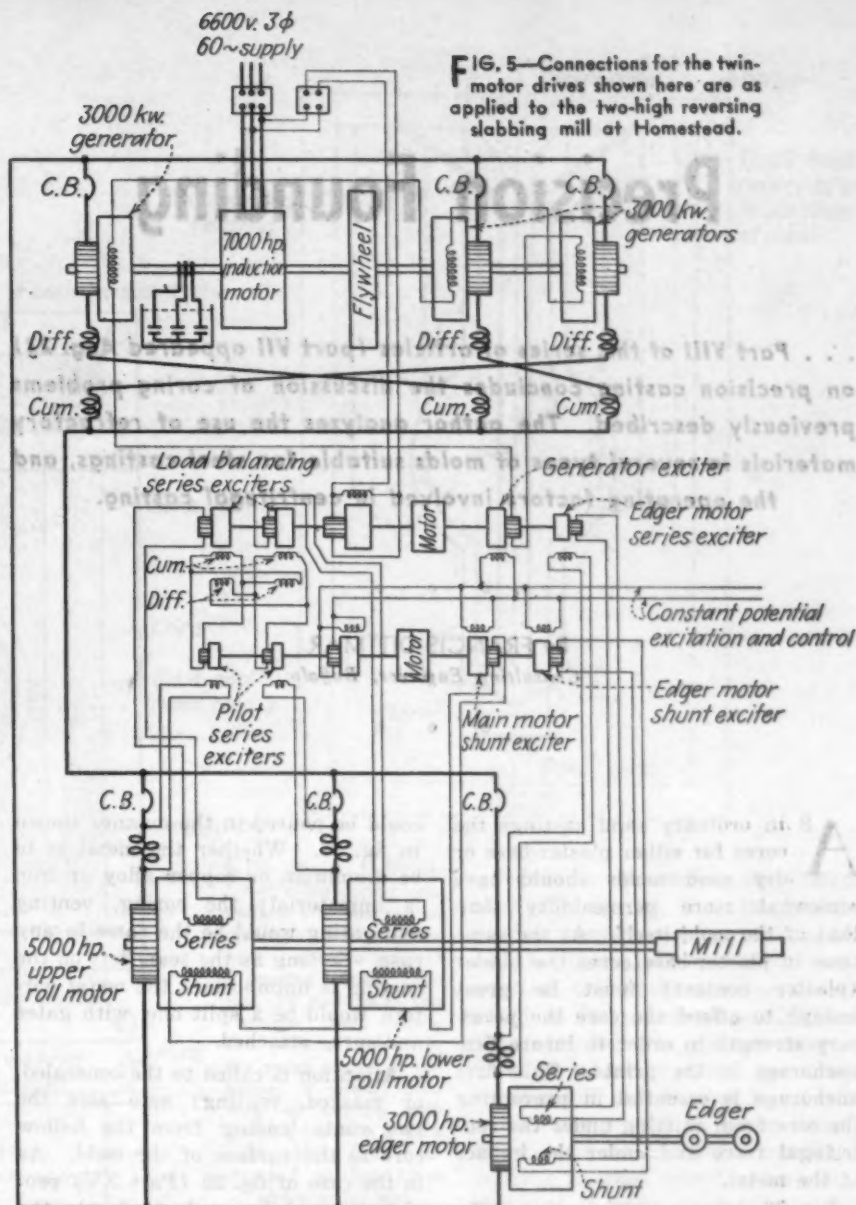


just themselves so that each roll has the same surface speed.

There was some question at first as to whether twin motors would synchronize closely enough to avoid curling plate as thin as 3/16 in., but experience has shown that no difficulty is likely to be experienced. The result of tests made at Homestead, in which the motor loads had been varied as much as 30 pct in relation to each other, showed that plates could be rolled in either direction without curling. Plate straightness was found to be controlled by the stripper plate adjustment and product as thin as 3/16 in. has been rolled without difficulty.

The four-high, 160-in. reversing plate mill at Homestead handles finished product ranging in size from 48 in. to 144 in. in width and 60 in. to 720 in. in length, and in thicknesses from 3/16 in. to 15 in. Slabs vary from 1 to 20 tons with present ingot weights. Fig. 6 shows a power chart for this mill showing the power required for the flywheel-generator set. The continuous curve shows the loads by the two 5000-hp motors on the main drive. Plate 84 x 0.812 x 248 in. was rolled in 11 passes from slabs 60 x 7 x 105 in. during this test run. The larger motor on the motor-generator set was provided to assure ample power at full speeds when rolling long plates inasmuch as flywheel energy would be consumed before the pass was completed and reversal would occur before the energy could be restored.

FIG. 5—Connections for the twin-motor drives shown here are as applied to the two-high reversing slabbing mill at Homestead.



# Precision Founding

**... Part VIII of this series of articles (part VII appeared Aug. 23) on precision casting concludes the discussion of coring problems previously described. The author analyzes the use of refractory materials in several types of molds suitable for steel castings, and the operating factors involved in centrifugal casting.**

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AS in ordinary sand castings the cores for either plaster-base or dry sand molds should have somewhat more permeability than that of the mold itself. At the same time in plaster-base cores the binder (plaster content) must be great enough to afford the core the necessary strength in order to insure firm anchorage in the prints. This firm anchorage is essential in preventing the core from shifting under the centrifugal force and under the impact of the metal.

Fig. 36 shows a simple coring problem where, for the sake of clarifying the subject of cores and gating, each casting is to be made separately. Under mass production such a casting would not be made in single flasks. The molds would lie in tiers, the patterns arranged on a horizontal plane around a central sprue, in a manner similar to the example shown in fig. 33, which procedure will be discussed presently. Meanwhile, the flask here consists of two rectangular frames dowed and locked together so as to form a square shell around the investment. In this instance the seam which forms on the casting is disregarded. However, where such a seam would be objectionable the casting would have to be made via the run-out wax process; this also will be gone into later. The mold and its core may be a plaster-base one or one of dry sand; for that matter it could also be a sand mold bonded with cement.

Since in the present case the core is too small to permit a pouring funnel to be inserted, single castings

could be poured in the manner shown in fig. 36. Whether the metal is to be aluminum or copper alloy or iron is immaterial; the coring, venting and gating would be the same in any case. So long as the seam left on the casting is unimportant the metal pattern would be a split one, with gates and sprue attached.

Attention is called to the concealed, or masked, venting; note also the two vents leading from the hollow core to the surface of the mold. As in the case of fig. 29 (Part XV) provisions must be made to locate the pattern halves in the exact center of the frames; the locating "bridges" shown in fig. 36 effect such centralization.

## Wax Pattern Procedure

The wax pattern would be cast in a separate matrix, with their sprue in another. The reason for making two units is that a single matrix would be difficult to fill owing to the small diameter and lengthy gates through which the wax would have to flow. The gates, in assembly with the pattern, would be fused onto the latter. See fig. 37.

The core is made first and is poured in its split box around a central, slightly tapered and vaseline-coated rod of either brass or steel. This rod projects beyond the prints as shown in fig. 37 so that the projecting ends may first serve to centralize the pattern in the matrix and later also in the flask. When the investment in the flask has set, the rod is withdrawn, thus leaving a central vent in the core.

The core is placed in the matrix while still wet so that the hot wax poured around it cannot soak into its soft structure. Whatever wax infusion may occur later when the wax pattern melts out of the investment and the core is partly dry will be negligible. The pouring of the wax pattern is effected by means of the four gates shown in fig. 37, these then being cut off, and the seam left on the pattern is obliterated when the wax has hardened. Cutters made to fit the curvatures of the cylindrical parts of the pattern as well as its globular section would insure a retention of the correct shape and diameters of the casting.

The wax is run out of the mold via the four holes through which it was poured, these holes also serving as vents. No further venting would be necessary except inserting a wire in the still wet investment to produce the vents leading from the core vent to the top of the mold as was done in the example shown in fig. 36.

While there is no reason why the run-out wax process could not be used in a dry sand mold there would be no point in employing such a procedure here since a dry sand mold would have to be in two halves and thus would leave a seam. The run-out wax process could, however, be used in a cement-bonded sand mold because the fluidity of cement-bonded sand is greater than that of dry sand and mixtures. But, where cement-bonded sands are used in connection with the lost-wax process the pattern walls should be so thin that no great seepage of wax into the mold takes place.

A durable plaster such as U. S. Gypsum Co. Hydromite would be a suitable material for matrices. Hydromite sets as hard as stone and stands up well under hard usage. Directions furnished by the manufacturer should be followed carefully; as has been pointed out earlier, this form of plaster is a little tricky to handle and requires thoroughgoing attention with regard to its manipulation. Do not shellack the matrices; soak them in water prior to pouring.

Taking as an example the casting shown in fig. 36, but cutting off one of its cylindrical parts so that the job

will look as in fig. 38, it will be realized that the core would be insufficiently supported by one print, no matter how substantial its one-end anchorage may be. Both the centrifugal force itself and the impact of the metal would tend to force the

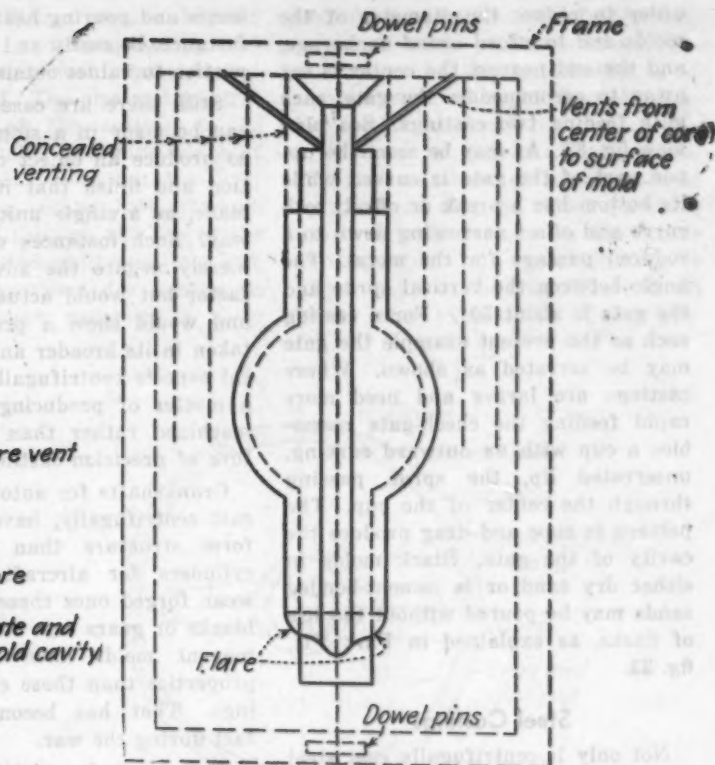
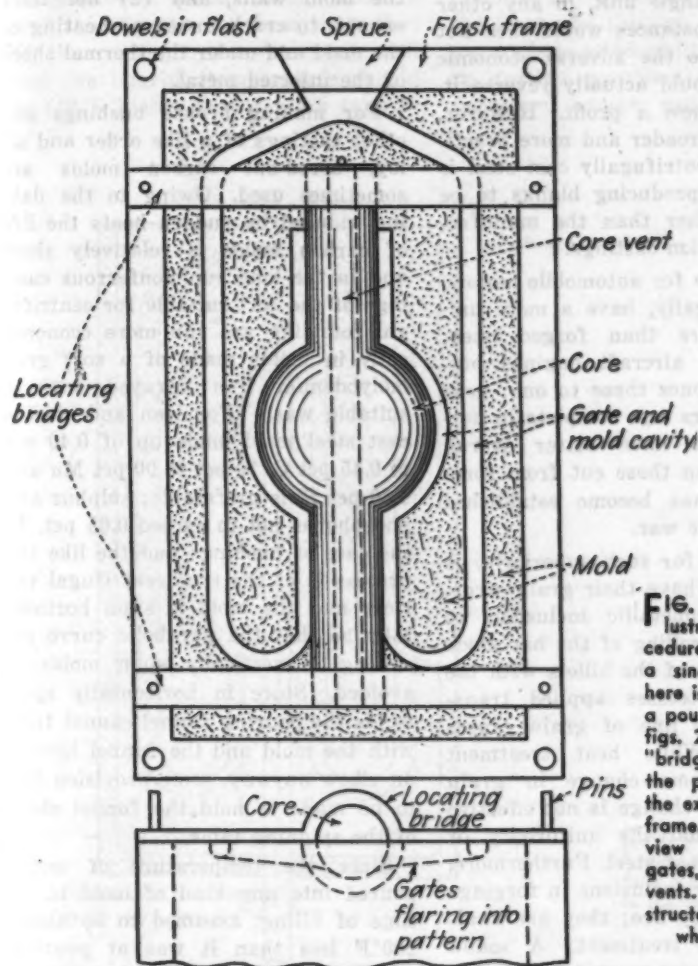


FIG. 36—A (left) illustrating coring procedure with the use of a single flask. Core here is small to warrant a pouring funnel. (See figs. 29 and 35.) The "bridges" help locate the pattern halves in the exact center of the frame. B (right) Side view of casting with gates, showing core vents. Note flare constructed at bottom where gates join.

core out of alignment, even when the inrush of the metal is checked by a form of special gating presently to be examined. Consequently the core will have to be supported in some other fashion.

As to making the core, there are two procedures. One would be to make the wax pattern hollow by filling and emptying its matrix several times until the necessary wall thickness has been built up—as has been explained earlier—and then pouring the core mixture into the hollow pattern. The other method is to make the core first and then pouring wax around it while it is held firmly in a matrix.

In either case the ball part of the pattern is supported by means of pins (ordinary tailor's pins), which are pushed through the wax pattern and into the core in such a fashion that the heads of the pins project about  $\frac{3}{8}$  in. beyond the wax, this in turn anchoring the core to the investment

of the mold after the wax has run out. When the casting is of a copper alloy the pins should be of brass; for iron castings steel pins are used. If an aluminum alloy is to be cast the pins must perforce be made up by hand of thin aluminum wire, with one end bent to insure a firm grip on the investment. In all cases the pins fuse with the metal. Should it be necessary to remove the thin pins left in the inside of the casting, one made of aluminum would be the more difficult, owing to acid-resisting qualities of this alloy; however hydrofluoric, hydrobromic, perchloric, or phosphoric acids would be effective. For copper alloys and iron, nitric acid would be used.

Warming the pins slightly beforehand prevents cracking the rather brittle wax. This method of supporting blind cores is especially useful when work is so thin-walled that even the slightest displacement of the core means a lost casting.

It will be observed in the example, shown in fig. 38, that the metal is poured through the top of the mold cavity. There just is no other way of pouring this casting unless it were gated at its spherical part. Where the gates join the pattern they are flared to whatever extent the finished casting will permit, that is, since the gates leave marks on the casting its design and specifications usually determine to what extent gates may be enlarged in order to facilitate rapid filling of the mold. It will further be noted that the core is headed. It is headed so as to afford all the anchorage necessary without extending its length. The central vent in the core is relieved by two smaller vents as shown in fig. 36. The number of pins used in supporting the core and their placing is always a matter of expediency; they should be inserted where no injury to the appearance of the casting is caused and where their traces can be readily removed.

### The Check-Gate

As its name implies, this type of gate is designed to slow down the inrush of metal when the mold cavity lies some distance from the center of the vortex. Fig. 39 shows the same casting discussed previously but here poured in stack molds. While but three tiers are shown, as many as 10 or more could be used, resulting in the so-called Christmas-tree formation yielding around a gross of castings at a pouring.

Here, too, the cores are headed in

order to reduce the diameter of the molds and to afford sound anchorage, and the end nearest the center is cut away to accommodate the gate, each gate feeding two castings. See plan view fig. 39. As may be seen, the upper part of the gate is curved while its bottom has a break or offset, both curve and offset narrowing down to a reduced passage for the metal. The angle between the vertical sprue and the gate is about 30°. For a casting such as the present example the gate may be serrated as shown. Where castings are larger and need more rapid feeding the check-gate resembles a cup with an outward curving, unserrated lip, the sprue passing through the center of the cup. The pattern in cope and drag produce the cavity of the gate. Stack molds in either dry sand or in cement-bonded sands may be poured without the use of flasks, as explained in Part VII, fig. 33.

### Steel Castings

Not only is centrifugally cast steel comparable to drop forgings but such castings cost less to machine, require no expensive dies and equipment and the foundry setup has a lower first cost and is less expensive to maintain than that of a hammer shop. Moreover, production is speedier and requires less skilled help.

To be sure, under conditions where cost is not a governing factor and where facilities, in general, are better than those common to most foundries, small steel castings may be made with a fair degree of accuracy and a reasonable percentage of usable output. For instance, the 3-in. ring could be cast in a permanent mold or in a sand mold bonded with cement to which suitable mold sprays had been applied, and if such castings are cored, as the ring would be, the cores would be made of either dry sand or of zirconium silicate or of a sand bonded with cement. The ring would remain a semi-centrifugal operation and the sprue would be through the core while the gates would lie partly in the core and partly in the base plate, the latter being made of whatever refractory material is used.

Dry sand and cement-bonded molds are made of a synthetic sand structure so composed that, on coming in contact with liquid steel, the mass expands to within predetermined and repeatable limits and thus make it possible to hold the ring within a reasonable approach of its specifications. However, such a procedure, involving virtually laboratory control over all factors including sand mixtures,

bonds and pouring heat would, in this instance, be costly and out of all proportion to values obtained.

Still, there are cases where pieces can be made in a single casting and so produce an object of such formation and finish that it could not be made, as a single unit, in any other way. Such instances would then not merely negate the adverse economic factor but would actually reverse it, and would show a profit. However, taken in its broader and more practical aspects centrifugally cast steel is a matter of producing blanks to be machined rather than the manufacture of precision castings.

Crankshafts for automobile motors, cast centrifugally, have a more uniform structure than forged ones; cylinders for aircraft engines outwear forged ones three to one; gear blanks or gears cast complete in permanent molds have better overall properties than those cut from forgings. That has become established fact during the war.

The reason for such superiority is that forgings have their grain structure and nonmetallic inclusions in line with the rolling of the bar stock or the forging of the billets with the result that stresses applied transversely to the line of grain causes separation. While heat treatment does cause some change in grain structure that change is not effective enough to equal the uniformity of centrifugally cast steel. Furthermore, the nonmetallic inclusions in forgings stay where they are; they are unaltered by heat treatment. A sound steel casting, heat-treated, has equal properties in all directions.

There are on the market a good many products now either forged or cast statically upon which considerable machining has been performed; cast centrifugally such products could often have their machining costs appreciably reduced if not dispensed with altogether.

Steel may be cast centrifugally in either dry sand or in what is tantamount to green sand molds, namely in cement-bonded ones—or in so-called permanent molds. The latter will be looked into first.

### Permanent Molds

There is, to begin with, no such thing as a truly permanent mold; the term is merely comparative. Further, the metal is never poured directly against the metal mold walls; between mold and casting there is always an intervening layer of some refractory material. This layer varies in thickness from that forming an ac-

tual liner, made separately and inserted in the mold—the mold then becoming a mere flask—to a spray applied to the mold walls. This spray may be built up to varying thicknesses—always just thick enough to (1) afford sufficient protection for the mold walls, and (2) not thick enough to crack under preheating of the mold and under the thermal shock of the injected metal.

For making bronze bushings and other castings of a like order and alloy, bored-out carbon molds are sometimes used. Owing to the flaking induced by sudden heats the life of carbon molds is relatively short and in the long run nonferrous castings of the sort suitable for centrifugal founding are run more economically in molds made of a soft gray molybdenum iron sprayed with a suitable wash. For iron and steel a cast steel mold made up of 0.40 pct to 0.45 pct C, 70 pct to 90 pct Mn and 0.30 pct Si is preferable; sulphur and phosphorus not to exceed 0.05 pct. In the case of bushings and the like the process is of the true centrifugal variety and the mold is spun horizontally so that the parabolic curve resulting in vertically spun molds is avoided. Since in horizontally spun molds the pouring funnel cannot turn with the mold and the funnel having an elbow anyway, some provision has to be made to hold the funnel clear of the spinning table.

Since the temperature of metal poured into any kind of mold is, at time of filling, assumed to be about 200°F less than it was at pouring time it should be realized that permanent molds like plaster-base, dry sand and cement-bonded types must be preheated. Permanent molds are usually 400° F at time of pouring. A further preservation of critical heat is effected by preheating the pouring ladles.

### Mold Spray

The mold spray is of the composition mentioned in Part VII, a siliceous flour, western bentonite and glutrin, the latter serving to increase the surface tension of the water and thus tending to hold in better suspension the fine siliceous material. The mixture should be kept agitated in some fashion or other while spraying the mold. A small addition of sodium silicate will impart to the spray better adhesive quality; the spray-nozzle must be kept clean when sodium silicate is used lest this material clog the fine passage. The use of hydrochloric acid is not recommended since this shortens the life of the mold. The molds are sprayed while hot.

Permanent molds should not have their mold walls of a smoothness that the spray cannot adhere evenly, that is, the spray slips off in spots. For rapid chilling use colloidal lead and graphite as a spray; for slow chilling the mixture formulated in Part VII.

Permanent molds should have a wall thickness two to three times that of the casting's cross-sectional wall and the pouring temperature should be 100°F higher than for dry sand or

Silica sand liners require heavier wall sections and consequently the venting through such walls is not quite so rapid. The size and general peculiarities of the casting to be made will usually determine which of these materials is best suited.

Since gases escape both through the liner and through the top of the mold where mold walls and liner end, no further provision for venting is necessary except using as a cover

coating and into the mold faster than that heat would penetrate into a stationary mold. This, incidentally, is of advantage since rapid heat dissipation is often desirable.

Whatever abrasions of mold material such as those of liners or mold spray there may be, these particles are invariably found near the center of the vortex. In a cored job they lie at the inside of the hole. There would be no other explanation of this phe-

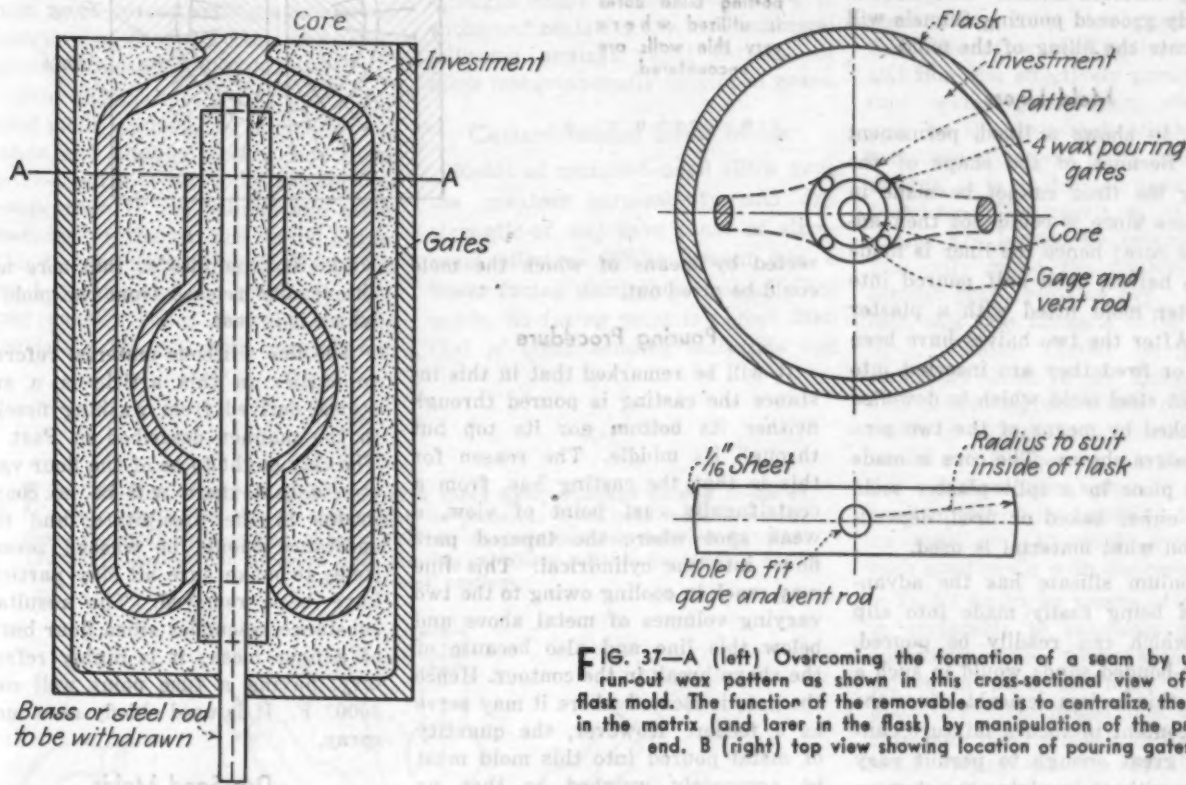


FIG. 37—A (left) Overcoming the formation of a seam by use of a run-out wax pattern as shown in this cross-sectional view of a solid flask mold. The function of the removable rod is to centralize the pattern in the matrix (and later in the flask) by manipulation of the projecting end. B (right) top view showing location of pouring gates.

cement-bonded molds even when molds are preheated.

Zirconium silicate or cement-bonded flour sand of a fine mesh may be used as materials for permanent mold liners and cores, although cores must be so thin-walled that they will crush under metal contraction during cooling and no sprue must be left inside them, a feature which will be examined presently. The liners, on the other hand, can be as substantial as is necessary for their handling and may be precoated with a spray, this depending on the smoothness of skin desired and various other considerations. The advantage of using zirconium silicate lies in the readiness with which this material may be cast in plaster molds and in its affording thin-walled liners of great strength through which gases may readily escape. These gases rise both through the liner itself and between the liner and the inner surfaces of the mold.

either a baked sand plate or one made from some other refractory substance. To pour metal against naked metal is asking for trouble.

When molds are sprayed only, the spray having been built up to a thickness determined by the size and shape of the casting and other considerations, and ascertainable only after tryouts, this thin lining cannot absorb gas of any volume but can only direct its upward rush.

The difference in life between a lined mold and one sprayed is about five or more to one in favor of the lined mold since the liner takes the brunt of the heat and impact of the metal, while the thin wall built up by mold spray offers only a highly evanescent intervention between the whirling liquid metal and the wall of the mold. But this does not mean that the spray coating washes off; it is just that hot metal in motion drives its temperature through the

nomenon than that the lighter particles are drawn through the spinning metal by the centrifugal force and finally come to rest near its axis.

Lined bushing may be made by pouring the shell into a horizontally spun mold, waiting a few minutes and then pouring in whatever alloy is used as a lining. For instance, if a bronze-lined steel bushing is wanted, a predetermined quantity of steel is poured into the mold, is allowed to cool under reduced speed to avoid hot tears and then after accelerating the speed again, an equally predetermined quantity of bronze is poured against the now partly solidified steel shell. The cohesion between the two metals is extremely sound.

In order to avoid hot tears and other flaws developing after filling the mold the table should be slowed down and completely stopped after a period carefully ascertained by try-

outs; both the slowed-down speed and the time elapsed to complete stoppage depending on the volume of the casting and in particular on the thickness of its cross-sectional wall.

In regard to speeds for vertically spun molds, owing to the skin friction and rapidity of heat dissipation metal climbs quicker in molds having been sprayed than it does in lined molds unless these are precoated. Hence the spinning speed of sprayed molds is less than that required for molds having inserted liners. The use of helically grooved pouring funnels will accelerate the filling of the mold.

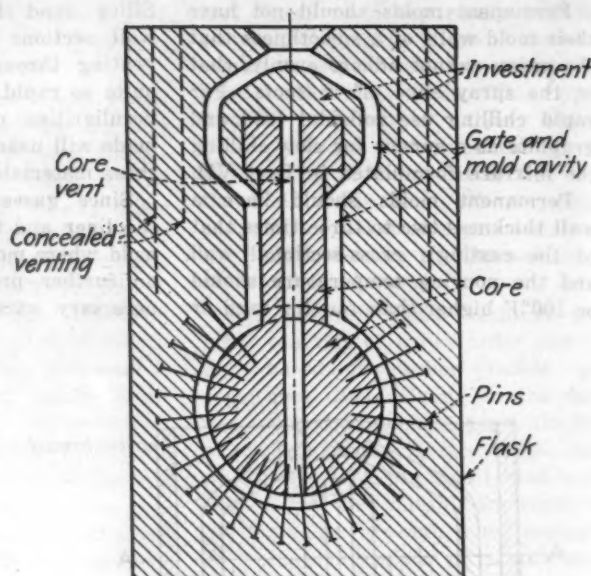
### Mold Liners

Fig. 40 shows a lined, permanent mold. Because of the shape of the casting the liner cannot be made in one piece since it could not then admit the core; hence the liner is made in two halves, each half poured into a plaster mold fitted with a plaster core. After the two halves have been baked or fired they are inserted into the split steel mold which is dowelled and locked by means of the two pins and wedges shown. The core is made in one piece in a split plaster mold and is either baked or fired, depending upon what material is used.

Zirconium silicate has the advantage of being easily made into slip form which can readily be poured. Cement-bonded sands would in such a case as this be less desirable since the water content in such a mixture cannot be great enough to permit easy pouring without involving the chances of cracking the cast during drying, although this rather delicately contoured cast could be filled under vibration. Dry sand, still less fluid, would not be suitable for a design such as the present one because the sand would have to be rammed and the resulting structure would hardly be strong enough for handling.

The general outline of the mold body conforms roughly to the casting contours for the sake of rapid heat dissipation; too massive a mold would hold the heat too long and so deteriorate the sooner. The body is reinforced by four ribs which, it will be noted, taper toward the mold's bottom. The peripheries of the ribs are turned to an accurate angle so that when the mold is dropped into a nest or socket fixed permanently on the spinning table the contact friction of the ribs drives the mold. Some sort of ejection device would be needed—if nothing better than two slots in the nest through which bars may be in-

FIG. 38—A modification of casting illustrated in fig. 36. Pins are for the purpose of anchoring core to investment after the wax has been melted out. The pins fuse with the cast metal. This method of supporting blind cores is utilized where very thin walls are encountered.



serted by means of which the mold could be pried out.

### Pouring Procedure

It will be remarked that in this instance the casting is poured through neither its bottom nor its top but through its middle. The reason for this is that the casting has, from a centrifugally cast point of view, a weak spot where the tapered part flows into the cylindrical. This line may crack in cooling owing to the two varying volumes of metal above and below this line and also because of the sharp break in the contour. Hence the gate is located where it may serve as a feeder. However, the quantity of metal poured into this mold must be accurately weighed so that no sprue remains. For if a sprue were to cool inside the core, the core could not be crushed by the cooling casting and while the casting may not actually crack it would in all likelihood develop weakness at that part. Because of this feature in the design of the casting the core is stopped-off where the gate is located.

(It will be found that when castings are poured short that their outside and inside contours are fully reproduced; it's just that the wall thickness will be found wanting.)

At its upper end the core has two annular rings or collars of different diameters. The upper, smaller diameter ring locates the core in the mold and the lower, larger diameter ring acts as a top plate against which the metal lies when the flask has been filled. The lower end of the core has two identical rings for the same purpose. The rings or collars designed for locating purposes as well as the upper and the nether surfaces of the larger diameter stop-plates have

slight draft angles so that core may the readier release from the mold in which it is cast.

The fine siliceous material referred to earlier in this article is a substance derived from washing fireclay in the manner described in Part II. The clay ought to be of the flour variety so that there will be no coarse grains in the precipitate, and this substance should be washed several times to make sure all clay particles have been removed. The resultant substance resembles silica flour but is of a finer mesh; it is highly refractory, having a fuse point well over 3000° F. It is used chiefly as a mold spray.

### Dry Sand Molds

Synthetic media are preferable for this type of founding, the silica sands being a mixture of coarse grains and those of a finer mesh and silica flour, this blend bonded with western bentonite, a cereal binder, core oil and water. For smaller castings an Ottawa sand of AFA finest 95 and a 140 mesh mixed with 20 pct silica flour would be suitable; for medium-sized work the silica flour content would be reduced while for large castings it may be omitted entirely, the sand mixture then having a body of AFA finest 60 with an appropriate addition of the 95 mesh.

Mixture of sand grains impart to molds a cushioning quality which prevents both mold and casting cracking under the impact of the metal. The reason for reducing the silica flour content, and for its complete omission in large molds, is the soaking period that filled molds are subjected to. The silica flour deteriorates under prolonged heat, and this deterioration

causes undue mold expansion with resultant irregularities in the casting. While addition of silica flour reduces mold expansion and affords maximum strength under heat, overly large amounts of it tend to confine the heat of the molten metal to a point where the silica flour collapses and causes mold expansion with resultant casting distortions. Consequently molds holding large quantities of molten metal—and because of this are subject to prolonged soaking periods—must be of corresponding openness of structure so that the heat may dissipate with greater rapidity.

Thus the thermal stability of a dry sand mold, achieved by a blending of sands and binding agents, has to be determined to a nicety by relating its composition to the volume and other features of the casting to be made. The factors fluctuating the least are the bentonite and the cereal, the former usually being about 4 pct and the latter  $1\frac{1}{2}$  pct, with core oil and

water in about the proportions discussed in Part VII.

For dry sand molds the spray is usually applied while the mold is still green although it may also be applied after baking while the mold is hot. Cement-bonded molds are sprayed after their period of air drying.

Because of gases generated by a liquid metal coming into contact with the binder materials it is advisable to introduce venting in dry sand molds. For, the density and consequent strength these molds must have to withstand centrifugally injected metal militates against rapid exhaust of these instantaneously developed gases.

### Cement-Bonded Silica Molds

Molds of cement-bonded silica have the greatest permeability and dry strength of any save those of zirconium silicate. While cement has a lower fusing point than that of silica sands, its fusing point is higher than that of other bonding materials and

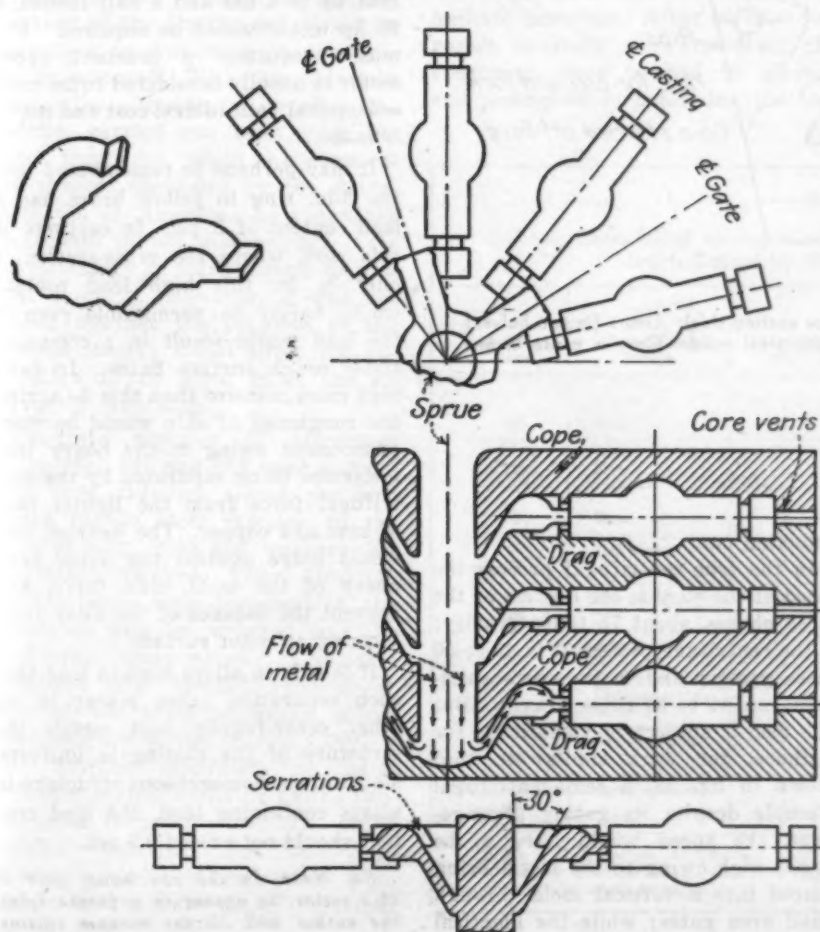
no gases of any consequence develop when liquid metal comes into contact with cement. Cores bonded with this material must be sufficiently thin-walled to prevent cooling castings from cracking or stretching.

The principle behind the use of cement is that this substance, unlike plaster, never completely absorbs the water content of its mix. To be sure, cement also has some affinity for water, is "thirsty," but not to the same degree that plaster has. Water, coming in contact with a grain of cement, surrounds that grain with a thin film of water-dissolved cement and this film effectively prevents further water penetration. Whatever may be the drawback of this characteristic of cement in its other applications, it is of decided advantage in founding. The result is that sand grains are bonded by means of this film only while the nucleus of the cement grain remains dry. Nonetheless, this film forms a most effective bond. Water should be perfectly clean and about 70° F. Temperatures only a few degrees either side of 70° result in an unsatisfactory bond. The sands and the cement are mixed dry for a few minutes either in a proper sand mixer or by tumbling to insure an even and thorough covering of each sand grain with the cement dust.

To fill flasks by means of vibration is preferable to ramming and even squeezing since force applied only serves to shift the mass from one place to another in the flask and pressure may readily result in too tight a mold. When castings are large an AFA finest 40 may be used; for medium-sized work a 60 finest Banding sand; for small castings the 95 mesh or finer, each mixed with smaller sized grains and with whatever quantity of silica flour may be required. The cement content will vary but slightly with the different sand compositions; from 9 to 11 pct will be found satisfactory in most cases and the water content in molds packed under vibration should not exceed 6 pct by volume.

The time required for air drying will not vary under normal weather conditions; it is 72 hr for molds of any size, the cement here discussed being of the quick-setting variety. Molds used in the run-out wax process may be subjected to low baking heats after air drying; preheating for pouring purposes is quite all right so long as the temperature does not exceed 250° F. Because of the excellent permeability of cement-bonded molds venting is unnecessary unless casting requirements impose an unusually tight mold structure.

FIG. 39—Illustrating the application of a check gate, designed to slow inrush of metal. (Top) Plan view of arrangement of patterns. Each gate feeds two castings. (Center) Cross-section of mold cavities. In practice more tiers can be used. (Bottom) Cross-section of check gate showing serrations suitable for slowing down metal in small castings.



After drying under a roof in the open air the molds are sprayed with an alcohol-base mixture of 25 pct each of: alcohol, core oil, glutrin, and either silica flour or the super-fine siliceous substance obtained from washed fire clay. Or the molds may be blacked, several coats being necessary to result in smooth castings.

Coarse-grained sands bonded with cement make excellent cradles. Pour-

around 2800° F. The steel is brought up to 3050° F, is slagged off and to every 50 lb of metal is added 1½ oz of shot aluminum and 3 oz ferro-manganese. In production setups of small castings via the continuous casting process the metal undergoes a preliminary refining in the cupola, and deoxidation is completed while it is in transit from the converter to the electric furnace, the latter usually an

casting produced in stack molds through a check-gate would require much less speed. Exact speeds, as remarked before, can be ascertained only by actual tryouts.

The same may be said for horsepower of motors driving spinning tables. For instance, the adverse economy of a mold about a foot in diameter or even less, clamped down on a spinning table 3 ft wide is obvious: power is lost in overcoming the inertia of the overly large table and further, unless the table is braked, its momentum will spin the mold too long after the metal has begun to cool, thus causing tears and other difficulties. It is not sound sense to spin molds on what amounts to a flywheel.

Large diameter tables ought to be supported at their peripheries by rollers or ball races both for the sake of vibrationless rigidity and relieving the driving mechanism of unnecessary loads, to say nothing of the starting load thrown on the motor. Well balanced and well supported spinning tables go a long way toward sound castings.

In general small molds and small diameter spinning tables require a 1/3 hp to ½ hp motor; molds weighing around 400 to 450 lb loaded, a 1 hp motor; up to 1000 lb loaded can be driven with a 5 hp motor; and beyond that up to a ton and a half loaded, a 20 hp motor would be required. For mass production a constant speed motor is usually considered to be more economical both in first cost and maintenance.

It may perhaps be remembered that the 3-in. ring in yellow brass had a lead content of 3 pct. In castings of this sort, where the cross-section is only ¼ in. this high lead content would barely be permissible even if the lead would result in a comparatively rough surface finish. In castings more massive than this 3-in. ring the roughness of skin would be more pronounced owing to the heavy lead molecules being separated by the centrifugal force from the lighter ones of zinc and copper. The heavier lead would lodge against the outer periphery of the mold, chill there, and prevent the balance of the alloy from forming an outer surface.

It is only in alloys high in lead that such separation takes place; in all other centrifugally cast metals the structure of the casting is uniform. To insure a homogeneous structure in alloys containing lead, the lead content should not exceed 0.5 pct.

*Ed. Note—In the concluding part of this series, to appear in a future issue, the author will discuss vacuum casting.*

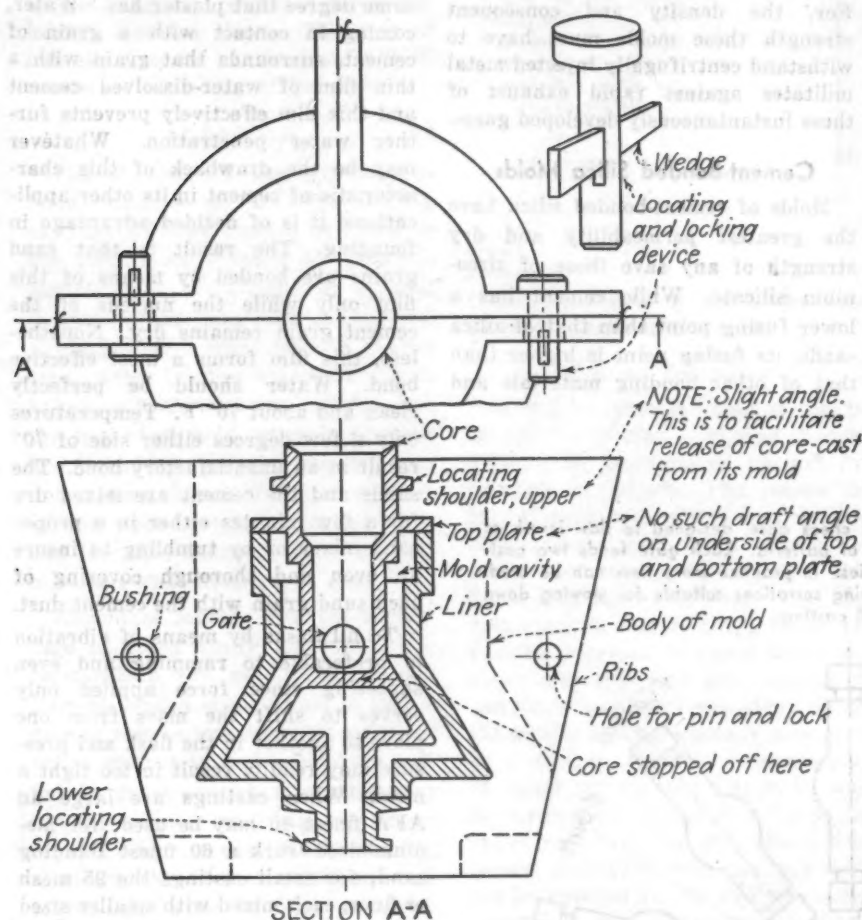


FIG. 40—Liner and core in permanent mold for casting steel. Liners (in two halves) after baking and firing are inserted into split steel mold. Core is made in one piece.

ing funnels may also be made from a finer mesh bonded with cement.

### Casting Factors Observed

Rigid control of sand mixtures and their bonds, of pouring temperatures checked at time of pouring by means of a pyrometer inserted in the pouring ladle, and constant spinning speeds once a suitable speed for the particular work at hand has been arrived at, is essential to successful results in all metals cast centrifugally.

In the case of steel, the temperature delivering the best packing results is

induction one.

In the true centrifugal process the speed of the mold is the highest of the three phases, about 75 times gravity; in the centrifuge process it is 40 to 50 times gravity and in the semi-centrifugal one 10 to 20 times gravity. But this also is subject to variations; for instance, for work similar to that shown in fig. 36, a semi-centrifugal example despite its gating arrangement, the speed would have to be rather high owing to the metal being poured into a vertical mold through small area gates; while the identical

# Alrok Treatment Avoids Masking Cast-In Inserts

By A. J. FERKO  
Boeing Aircraft Co., Seattle

**A**LUMINUM alloy castings with cast-in inserts of a dissimilar metal cannot be Anodized unless the inserts are masked. If the inserts are not masked the current will short through them and Anodizing cannot be carried out. Masking, however, is not a production process inasmuch as each part must be handled carefully and individually. Since it is more economical to cast-in inserts than to press them in place, it would be advantageous if those cast parts having cast-in inserts could be given a treatment that would not require masking of the inserts and would be equivalent to Anodizing in the protection afforded. With this object in view, the Boeing Aircraft Co., Seattle, carried out tests with the Alrok treatment, which is a chemical dip process developed by the Aluminum Co. of America. As the Alrok treatment is not electrolytic, it is not necessary to mask inserts to prevent shorting. However, it was not known whether the presence of the exposed inserts would affect the application of the Alrok finish and its corrosion resistance.

Separate samples of aluminum alloys 40E, 195 and 356 were coupled with bare, cadmium plated, and zinc plated carbon steel samples, in the form of bolts, nuts and washers, before being Alroked. After Alroking, the specimens were disassembled, the aluminum samples weighed and the specimens reassembled. Additional Anodized and Alroked samples of each of the three aluminum alloys were weighed to the nearest 0.0001 g and coupled separately to bare, cadmium plated, and zinc plated carbon steel samples. All the above coupled specimens and additional Alroked samples of each alloy were placed in the salt spray described

... Tests reported herein indicate that castings of aluminum alloys 40E, 195 and 356 with cast-in inserts need not have the inserts masked when given the Alrok treatment, as would be necessary in the case of the Anodized treatment for passivation.

in Government specification AN-QQ-S-91.

After a 200-hr exposure the specimens were removed from the salt spray. The coupled specimens were disassembled and the corrosion products were removed from the aluminum samples by alternately soaking them in water and alcohol with intermediate brushing. After all the corrosion products were removed, the specimens were washed in alcohol and reweighed to determine the loss

in weight due to chemical and galvanic corrosion. The amount of corrosion on the Alroked aluminum samples which were coupled with inserts is given in table I.

The Alroked aluminum samples which were not coupled with inserts showed no corrosion after the 200-hr exposure to the salt spray. Therefore, these samples were not reweighed. The amount of corrosion on the anodized aluminum samples is given in table II.

TABLE I  
Galvanic Corrosion of Alroked Aluminum Casting Alloys With Dissimilar Metal Inserts Caused by 200-Hr Exposure in Salt Spray

Aluminum Alloy	Carbon Steel Inserts	Specimen No.	Condition of Alroked Aluminum Sample	
			Appearance	Pct Weight Loss
195	Bare	1	Moderate corrosion around insert	0.426
		2	Light general corrosion	0.306
356	Bare	1	Moderate corrosion around insert	0.422
		2	Moderate corrosion around insert	0.276
40E	Bare	1	Moderate corrosion around insert	0.396
		2	Light corrosion around insert	0.189
195	Zinc plated	1	Slight corrosion around insert	0.069
		2	Slight corrosion around insert	0.082
356	Zinc plated	1	Slight corrosion around insert	0.060
		2	Discoloring around insert	0.045
40E	Zinc plated	1	General discoloring of panel	0.057
		2	General discoloring of panel	0.045
195	Cadmium plated	1	Slight corrosion around insert	0.026
		2	General discoloring	0.012
356	Cadmium plated	1	Slight corrosion around insert	0.026
		2	Discoloring around insert	0.023
40E	Cadmium plated	1	General discoloring of panel	0.013
		2	General discoloring of panel	0.012

Note: Specimens numbered as follows: (1) Alroked with aluminum part containing carbon steel insert. (2) Aluminum part Alroked before coupling with carbon steel inserts.

The conclusions based on the foregoing tests were:

(1) Aluminum alloys 40E, 195 and 356 containing bare, cadmium plated, or zinc plated carbon steel inserts can be Alroked satisfactorily without masking the inserts.

(2) The Alroked specimens had approximately the same corrosion resistance as the Anodized specimens. Since aluminum casting alloys in general are more corrosion resistant than the wrought alloys, equivalent results should not necessarily be expected on wrought alloys.

(3) Alroking the aluminum samples before coupling with the inserts reduced the amount of galvanic corrosions only slightly.

TABLE II

Galvanic Corrosion of Anodized Aluminum Casting Alloys With Dissimilar Metal Inserts Caused by 200-Hr Exposure to Salt Spray

Aluminum Alloy	Carbon Steel Inserts	Condition of Anodized Aluminum Sample	
		Appearance	Pct Weight Loss
195	Bare	Breakdown of film around insert	0.355
356	Bare	Breakdown of film around insert	0.282
40E	Bare	Breakdown of film around insert	0.380
195	Zinc plated	Discoloring around insert	0.046
356	Zinc plated	Discoloring around insert	0.044
40E	Zinc plated	Discoloring around insert	0.051
195	Cadmium plated	Discoloring around insert	0.018
356	Cadmium plated	Discoloring around insert	0.014
40E	Cadmium plated	Discoloring around insert	0.012

## All-Purpose Synthetic Adhesive

**P**LIOBOND is the name given an all-purpose adhesive that is said to bond anything to anything. Developed by Goodyear Tire & Rubber Co., and marketed by the United States Plywood Corp., this synthetic complex compound has resin-like properties and rubber-like characteristics. It stems from a family of organic elastomers, more commonly called synthetic rubbers.

The new adhesive has already been successfully employed for bonding a variety of materials including metals,

plastics, fabrics, ceramic ware, vulcanized rubber, paper, leather, glass, plaster, wood and concrete. In many cases, where Pliobond is used, the bond itself has proved stronger than the bonded materials, and it has the added advantage of being flexible, waterproof, and resistant to the action of chemicals, hydrocarbons, and oils or greases.

Because of its ability to bond metal to metal, the adhesive may be used to assemble jigs and fixtures quickly and accurately, and because the bonding is simple, the heat required is insufficient to cause warping of the metal. If necessary, the bond may be disassembled by suitable means that will not harm the assembly. In delicate equipment, where riveting, soldering or welding is difficult or impossible, Pliobond should prove extremely useful. In addition to be-

ing an adhesive, it is also a sealant, and may therefore be used for such jobs as putting together a motor case or small working part that must work in or near gasoline or lubricating oil.

The cement can be applied by brushing, spraying, spreading, or roller coating, and reaches a tacky stage in about five min or less, and will dry tack-free in 10 to 15 min. although this time may be varied through the use of different solvents to suit particular applications. For porous materials the cold or wet bonding process may be used satisfactorily. A liberal coat of cement is applied to both parts and allowed to dry until tacky, and the parts are then pressed together for about 10 min. Maximum bond strength will be attained when the material has become thoroughly set, which does not usually require more than 48 hr. If desired, the cement may be allowed to dry completely, and then be reactivated or tackified by moistening the surface with acetone, methyl ethyl ketone, ethyl acetate, butyl acetate, or amyl acetate prior to combining. When quicker setting is required, or when nonporous materials are to be joined, the hot process will give the best results. Parts are coated with the cement and dried thoroughly in air or in an oven at 200° F for 5 min. The coated surfaces are then pressed together at a temperature of 200° to 325° F for about 1 min under a pressure of 100 to 300 psi. Full bond strength is developed on cooling.

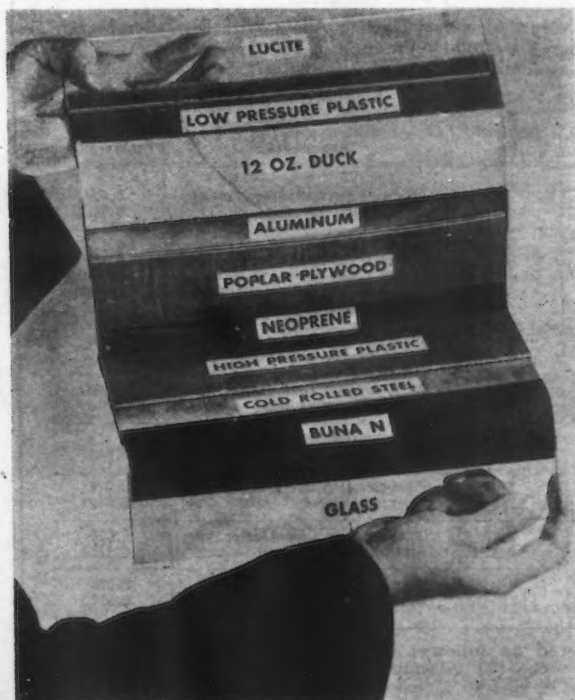


FIG. 1—A demonstration piece of ten different materials bonded together with Pliobond to show the ability of this cement to bond anything to anything.

# New Equipment...

## Welding

... In this week's issue are described interesting developments in the welding field, including several types of electrodes, spot and seam welders, torches, portable welding units, and various accessories.

**A**N arc-welding electrode has been announced by *Metal & Thermit Corp.*, N. Y. Called "Murex Type HTS" the product is a mineral-coated electrode with less penetrating arc than so-called "hot-rods." The weld metal produced is of high tensile strength, with the ductility and X-ray soundness of metal produced by down-hand electrodes. It is said that the electrode was developed to prevent underbed cracking in the welding of high tensile steel plate, such as that used for certain classes of ship construction. Because it minimizes pick-up of undesirable elements from the parent metal and prevents cracking and porosity in the weld, it is also being found useful in welding "dirty steels" or steels containing impurities, as well as in welding cold-rolled, high carbon and high sulphur steels and free-machining steels used for mechanical molds. In some applications it is being used successfully in place of the more expensive stainless steel electrodes.

### Electrode Holder

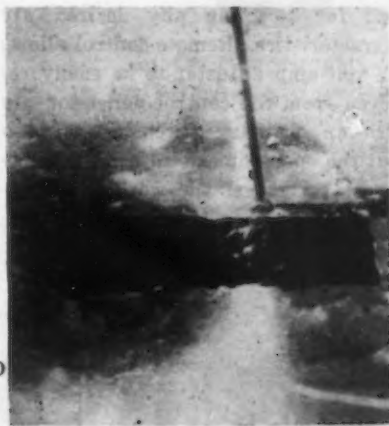
**A**N electrode holder called a Gary 350, has been announced by the *Yarco Distributors*, 215 W. 7th St., Los Angeles 14. This holder offers practical improvements in design to increase welding efficiency. It is light in wt, simple and compact for ease in manipulation. Offset jaws



provide a full view of work at all times, making welding possible in places ordinarily inaccessible. Bending of the rod and breaking the flux is never necessary. Full throat construction provides easy flow of electricity with a min of resistance. It is ventilated for cool handling, and is equipped with a mechanical cable connector which does away with the solder method.

### Arc-Oxygen Electrode

**U**NDERWATER cutting of steel with the arc-oxygen electrode has just been announced by the *Metal and Thermit Corp.*, 120 Broadway,



N. Y. The electrode, said to be developed from two independent steel cutting operations, utilizes the heating properties of an arc flame, ranging from 6,000° to 10,000° F., for underwater kindling of steel plate and beams to the burning point. Into the molten steel thus produced, a jet of pure oxygen is produced to cut cleanly through the steel. This underwater welding electrode, known as Mures type CW, is supplied in 1/4-in. to 1/2-in. sizes. For general salvage operations the 3/16-in. size is by far the most

widely used and is employed for welding plate from 1/4-in. to heavier thicknesses, and can also be used effectively for cutting material up to 1/4-in. in thickness. This tubular steel electrode may also be employed for cutting nonferrous metals and iron. It may likewise be used in the open air for the cutting of difficult high alloy steels, such as austenitic stainless.

### Precision Welder

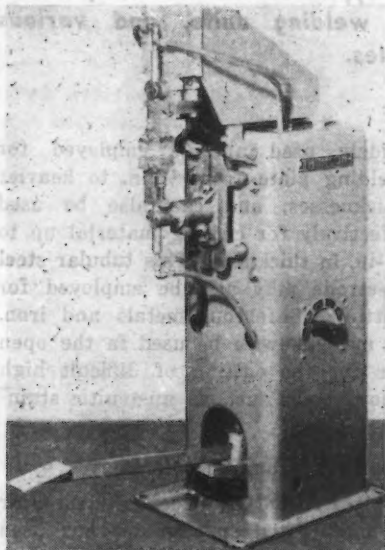
**A**PRECISION rocker arm air operated spot welder has been announced by *Precision Welder & Machine Co.*, Cincinnati. It is designed to take advantage of the latest knowledge gained in the resistance welding field, together with the newest improvements in air operated machinery. Among the features claimed are: (1) Unit construction and easy accessibility keeps maintenance to a min. (2) Use of air terminal block increases speed of operation to over 200 spots per min and keeps piping to a minimum. The solenoid air valve can be removed without removing piping or wiring. (3) Sides of machine are kept clear



for material handling and storage in keeping with motion-time production methods. (4) Frame is box type fabrication with removable top member. Unbroken side panel construction insures max rigidity.

#### Wire Cable Welder

**E**QUIPPED with special clamping dies and special head for straight line vertical action a 15 kva Model C Spot Welder has been announced by



Thomson-Gibb Electric Welding Co., Lynn, Mass. As the upper head descends the cable is clamped and held firmly by the stationery half of the dies while the other half continues to move downward, stretching the cable. The welding current is applied and all of the cable strands are welded together while at the same instant the cable is stretched to the breaking point. The cable ends are welded and flattened, exactly as wanted.

#### Hard Surfacing Electrode

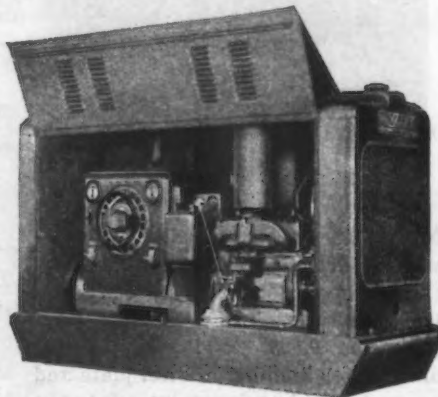
**H**EAVY coated hard surfacing electrode that welds like mild steel, has been announced by The Hobart Brothers Co., Troy, Ohio. This electrode, designated as "Tufanhard" is made in three grades, 600, 400 and 250 which corresponds with the Brinell hardness of deposited metal. It can be used in all positions with no more skill than is required by the so-called cold rod. The welds can be made continuously with overlapping beads without the necessity of removing the slag, and the low spatter loss and smoothness of bead requires only a small amount of grinding in finishing, making it very economical to use. The deposit can be heated and drawn to any temper within the range of the type rod used.

#### Transformer Welder

**A** 200 amp Wilson "Bumblebee" transformer welder to meet the need for a high quality AC machine of medium capacity, incorporating the latest features for economy in power consumption and high-speed, quality welding, has been announced by Air Reduction Sales Co., 60 E. 42nd St., New York 17. Built-in capacitors make possible power economies up to 35 pct, reduce power bills and power input, and relieve overloaded transmission and plant feeder lines, making room for additional equipment. The unit is also equipped with a disconnect switch. The machine is entirely self-contained and is sturdily constructed for dependable, economical service. All windings are covered with the latest spun-glass fibre, heat resistant Class B non-inflammable insulation.

#### Arc Welder

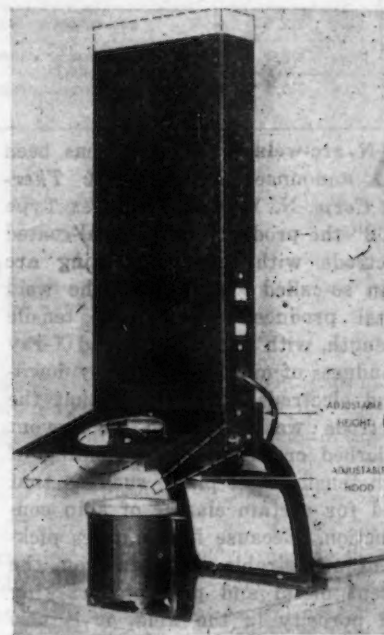
**A**LIGHTWEIGHT but husky, full capacity 200 amp simplified engine driven arc welder has been announced by The Hobart Brothers Co., Troy, Ohio. It is completely enclosed in a compact steel canopy with hinged side panels and powered with a 26 hp four cylinder engine for economical operation. Dual control makes available 1000 combinations of open circuit voltage and welding current for selecting any desired arc characteristics. Remote control allows the volt-amp adjuster to be easily removed from the control panel for use with an ordinary extension cord so that the operator can adjust the welding heat right at the work, eliminat-



ing repeated trips between the welding work and machine. Standard equipment also includes the mercury type idling device which automatically idles the engine when not in use, cutting down on fuel consumption and engine wear.

#### Soldering Stand

**T**HE model SS11 Soldering Stand, embodying the flexibility required for soldering with either iron, torch or soldering pot, has been announced by the Ess Specialty Corp., Bergenfield, N. J. The hood and fume stack can be raised and lowered to accommodate any of the three heating elements used in soldering. This soldering stand permits interchangeable soldering, greater protection against



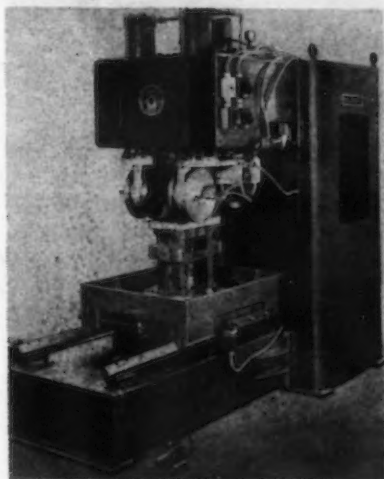
injurious fumes, minimizes hand fatigue and eye strain, and increases soldering production and efficiency. Soldering with this stand allows maximum freedom for work passing, enables the operator to focus attention on the soldered joint by means of the plate glass window (or magnifying glass) in the hood thus quickening the soldering pace by elimination of lost motion.

#### High Tensile Electrode

**A** SHIELDED arc electrode for groove butt joints and welding horizontal or flat fillets in the higher tensile steels, has been announced by the Lincoln Electric Co., Cleveland. Designated as "Fleetweld 11-HT," it has characteristics not found in previous rods designed for welding steels of this type. Field tests have shown that the quality of groove butt joints made with this electrode are good and free of porosity. Fillet welds are said to be smooth with a flat face. The electrode has a low spatter loss and welds are produced with a steady arc and are free from undercut. Either ac or dc may be used and if dc is used, the electrode should be negative.

### Duplex Seam Welder

**D**ESIGNED for simultaneous seam welding of two or more parallel seams on one surface, duplex seam welders have been announced by *Progressive Welder Co.*, 3050 E. Outer Drive, Detroit 12. These new resistance welding machines offer definite economies for many types of fabricating operations. The machines are available in a wide range of capacities



and sizes, are air operated and fully automatic. A duplex head on the machine accommodates either two or four welding wheels. They are available with transformer capacities up to 500 KVA to meet users' requirements; a wide range of work table sizes and travels; and many combinations of welding wheel diam. and spacings. Conventional timing and sequence controls are used. Stroke of the head is adjustable.

### Square Frame Welder

**T**HE model WA-300, which provides a welding service range, rating of from 60 to 375 amp, has been announced by the *Harnischfeger Corp., Welding Div.*, Milwaukee 14. The large model retains the two-part construction, single heat control,



visual current calibration, and adaptability to parallel operation where higher amp is desired. Appearing for the first time in the model WA-300 are such features as weatherproof construction, polarity reversing switch, and removable stator, plus overload protection both for contacts and for the low-voltage magnetic starter.

### Midget Spot Welder

**T**WO bench type universal midget automatic spot welders for precision welding of light metals have been announced by *Interstate Machinery Co., Inc.*, 1431 W. Pershing Rd., Chicago 9. They may be equipped with built-in automatic weld timer or with separate timer panel for stitch



welding. Automatic repeat pulsation welding or synchronous one-cycle timer. Both types are equipped with water-cooled transformer, and electrodes and tips and are air operated, and controlled by foot switch, solenoid valve and pressure switch.

### Copper Welding Electrode

**A**N electrode for arc welding known as EutecTrade 28, has been announced by the *Eutectic Welding Alloys Co.*, 40 Worth St., N. Y. 13. It can be used for the arc welding of bronze, brass, and copper. This electrode contains a combination of metals and is shielded with a newly devised flux coating that makes it suitable for use either on ac or dc current. It will deposit dense and tough metal that is a good color match to most types of bronzes.

### Welding Attachment

**A** 3-STEP Thinweld attachment that gives wider range to standard arc welding machines and makes it possible to weld from 10 amp up through the maxi rating of the

welding machine without any dead spots in the complete welding ranges, has been announced by *The Hobart Bros. Co.*, Troy, Ohio. This is an attachment for arc welding machines being used in widely diversified fabricating plants and job shops where the work may vary from extremely heavy to the lightest gauges practical for welding.

### Under-Water Cutting Torch

**A**N arc-oxygen under-water cutting torch has been announced by *Chicago Tool & Engineering Co.*, 8383 S. Chicago Ave., Chicago 17. It is said to be so simple in construction and ease of operation that no previous experience is required to cut various



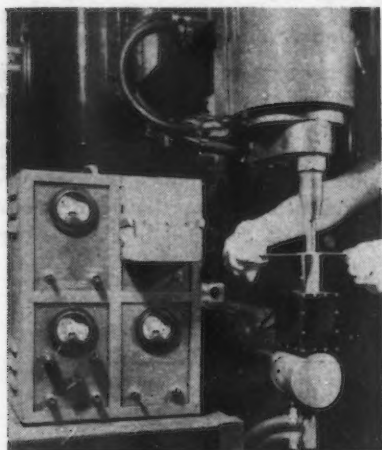
thicknesses of steel under water after only a very few minutes of instruction. A special tubular steel electrode was developed for use with the Palmgren underwater torch, using Oxygen, which assures safety in operation at any depth under water.

### Spot Welder

**T**YPICAL of the many wartime developments which may well reduce postwar production costs is the dual hydromatic multiple spot welder which has been announced by *Progressive Welder Co.*, 3050 E. Outer Drive, Detroit 12, for the assembly of ammunition boxes. Combining several operations in one, this dual welder permitted output of some 220 containers per hr, in a min of floor space. Economy of equipment is secured by using only a single transformer for both welding stations and using standardized parts for the various guns. Simple air shuttling fixtures reduce loading time. These have interlocking controls so that one operator welds while the other one is loading.

## Current-Force Recorder

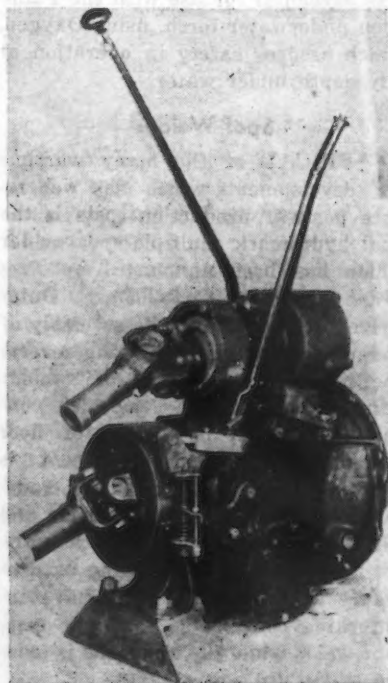
**A** CURRENT-FORCE recorder for recording current and force in resistance welding machine electrodes has been announced by *General Electric Co.*, Schenectady. Desirable for use in welding research and for the periodic checking of welding machine performance, the recorder is designed



to be helpful to users of energy-storage type welding machines for determining when forge pressure is applied to the work with respect to the discharge of welding current. Compact, portable, and easy to use, the recorder consists of an amplifier-oscillograph unit and a special electrode holder.

## Power Take-Off

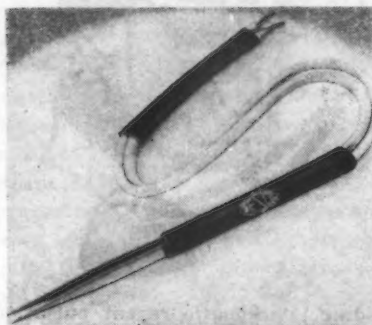
**A**N idea in a power take-off direct-connected to a truck motor and eliminating the conventional V-belt



drive, has been announced by the *Lincoln Electric Co.*, Cleveland. The power take-off can be installed in any Ford or Dodge truck as a permanent set-up, although it can easily be removed or reinstalled in a few min. Built as a unit, the driving mechanism fits directly over the standard transmission case of the truck and does not interfere in any way with the normal use of the truck. The outfit is available as a kit with complete instructions for mounting, or it can be installed in the truck by the manufacturers.

## Welding Tweezers

**I**T is now possible to unite tiny, almost inaccessible elements of a product by probing for the parts, bending and holding them and welding with a device that hooks on to standard spot welding equipment called the *Besco Spot Welding Tweezers*, which has been announced by *New Jersey Jewelers' Supply*, 280 Plane St., Newark 2, N. J. This acces-



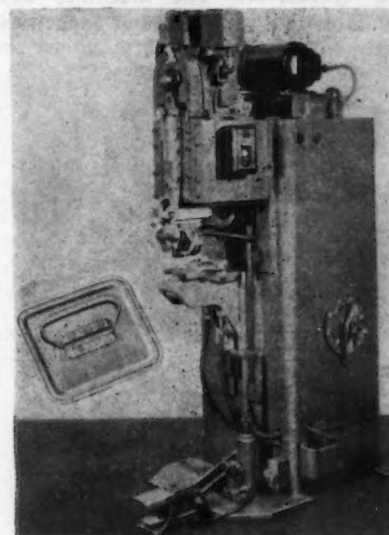
sory consists of a pair of insulated, forged, copper tweezers with plastic covered, flexible, copper leads terminating in a pair of lugs which connect in place of regular welding electrodes. These tweezers are said to be useful in the manufacturing of small precise units, instruments, toys, optical goods and jewelry. They will unite copper parts, nickel, steel, tin, brass and other metals.

## Anti-fog

**A**NTI-FOG preparation for keeping goggle lenses, face shields, and welding plates clear has been announced by the *American Optical Co.*, Southbridge, Mass. This AO anti-fog material, made from a scientific formula to penetrate the ultramicroscopic pores of glass, deposits a thin film which helps prevent fogging, steaming, and frosting of all types of glass surfaces. In addition, it removes grease and dirt from glass, and allows perfect visibility. The preparation is easily applied by simply spreading it on both surfaces of glass.

## Welding Press

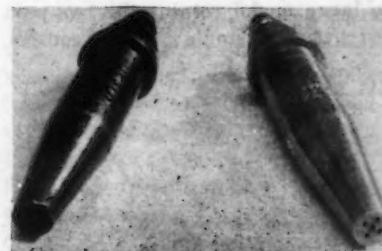
**R**EADILY adapted to special production the Thomson No. 1 welding press has been announced by *Thomson-Gibb Electric Welding Co.*, Lynn, Mass. The welder is motor operated, with solenoid clutch pull and electronic timing. Welding speed may be varied at will between 34 and 109




strokes per min. As shown here, the lower knee and upper terminal block are designed for attaching the handle cleats to a metal box cover. Locating fixtures make it easy to line up the box covers. The upper die is equipped with eight individually sprung electrodes and with a fixture to locate the handle cleats.

## Burner Tip Reclaiming

**A**CHEMICAL method for reclaiming burner tips and welding torch fittings has been announced by *Turco Products, Inc.*, Los Angeles. Burner tips and fittings used on welding torches and for brazing choke up with tenacious carbon, causing dimen-



sional changes which reduce the efficiency of the equipment. Manual methods of cleaning consume large amounts of time, and rarely is the equipment restored to its original state of efficiency. For lack of an effective method of cleaning, burner tips have frequently been discarded.



## The green light in metals... Revere has them NOW

Revere knows well how precious to the nation each of these post-war days can be, and how crippling to industry and employment could be a shortage of essential metals. That is why, since V-J Day, Revere has been in full production for peace.

Fortunately, Revere metals can serve the needs of creating as well as those of destroying, can make as fine bathroom fixtures as bomb fuses, as excellent radiators for automobiles as for half-tracks. No difficult reconversion problems have stifled the outpouring of Revere metals.

Revere copper, brass, bronze, aluminum, magnesium, steel, are ready *now*, are already busy in thousands of plants helping shorten the period of reconversion for industry and for the nation.

We are able and eager to do more. One inevitable result of Revere's war effort has been that not only our ability to produce, but our ability to give service, have been expanded many times. Revere research has probed further and deeper. Revere Technical Advisors are armed with greater knowledge and experience. New methods, metals and machines may save precious time or cut all-important cost for users of our metals.

In all these ways Revere is ready *now* to serve the manufacturing and building industries to help you prove *immediately* that America is even greater in peace than she proved to be in war. In the same way Revere is ready to serve home owners with its building products which are stocked by Revere Distributors in all parts of the country.

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*Join The Human Adventure on the Mutual Network  
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# Assembly Line . . .

STANLEY H. BRAMS

• Settlement of the 30 pct issue in the auto plants likely will set a pattern for the nation . . . Raises without cost adjustments are impossible . . . New 1946 Buicks are shown.



**D**ETROIT—Although the oil strikes have monopolized headlines in the Great Lakes area, where lack of gasoline has reduced car use to a level far below that of wartime, and although coal strikes dominate Pennsylvania's industrial scene, there appears to be fairly general agreement that automobile industry labor problems are definitely more important nationally, and that the shape of their solution will be more influential in determining the cost-price-profit triangle of the future.

Once again, General Motors is cast in a key role. Negotiations began between G.M. and the CIO United Automobile Workers union last week and are continuing. Both sides have stated their positions in traditionally uncompromising fashion, and the dickering to modify those standpoints will continue against the approaching shadow of a strike vote scheduled in G.M. plants for Oct. 24. Workers are expected to vote to support strike action, the same conclusion expected in Chrysler and Ford factories. Any settlement reached in the General Motors dispute will be echoed in the rest of the auto industry; and once that pattern has been determined, the rest of American manufacturing will likely follow.

There appears to be indication that the automotive industry has no great objection to a moderate wage raise. One thing bothering the automobile industry is that the union, by calling

for a 30 pct increase, seeks to maintain the same rate of take-home pay for 40 hr as it had for 48 hr, leaving the way open for a further big increment of pay to accrue when production work goes on a 48-hr basis, expected in much of the industry. Inasmuch as overtime would continue at time and a half under present arrangements, if workers received a 30 pct pay raise for the basic 40 hr, and then obtained an additional 30 pct for working eight overtime hr, the cost burden would be quite overwhelming and quite impossible.

This is not to say that the automobile companies, General Motors or others, see their way clear to making a 30 pct raise even without a prospect of overtime. The figures show that labor accounts for only around 28 pct of the cost of a car, and accordingly a raise of a third on this would bring it up only an actual nine pct or so of overall cost. But the bulk of the remaining car costs are lodged in materials and components and, again, a 30 pct raise at General Motors would be echoed by the same raise at the supplier plants. The net result would be to increase the overall cost of a car 30 pct, perhaps somewhat less.

Consider what this means. In 1939, the last year in which war production was not a factor in General Motors, the company had net sales of \$1,376,828,337. Net profit before taxes mounted to \$228,255,589. In other

words, costs were \$1,148,572,748. Increase these by 30 pct, and they rise to \$1,493,143,572. In order for the company to break even, its income would have to have been stretched approximately \$120 million during 1939; its wholesale price per car thereby would have to have been increased around \$80; retail markup on that basis would have had to increase around \$115 to maintain the customary dealer margin. It is an obvious impossibility to increase wages 30 pct without raising prices materially. It is equally apparent that even a 15 pct wage raise calls for considerable price readjustment.

**T**HE position the United Auto Workers has taken is tragic. It has whipped the ogre of inflation into very vivid life, and the "little people," the hourly pay workers who are members of the union, will be the first whose pockets are emptied by the demands of higher prices. Worth study indeed are the words of C. E. Wilson, G.M. president answering Walter Reuther's 30 pct pay raise demand:

"Inflation is the worst of all economic diseases. It reduces the value of money in terms of what money will buy. It reduces the value of the savings of the people. It undermines security. It underwrites depression. It destroys confidence. It creates unemployment.

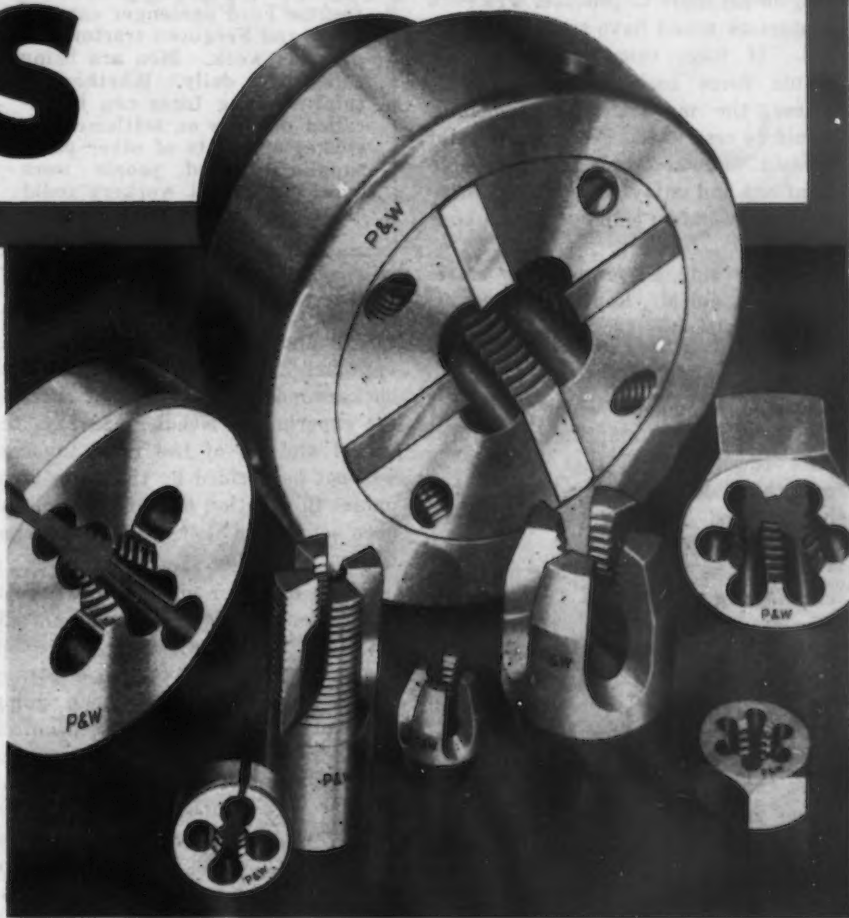
"We shall resist the monopolistic

**FIRST NEW BUICK:** First off its lines for 1946 at Buick is this series 50 Super 4-door sedan mounted on 124 in. wheel base. Full airflow fenders are provided, together with a completely restyled radiator grille and bumper assembly. The straight eight valve-in-head engine has precision bored and specially honed cylinder barrels, together with numerous other mechanical improvements.



# For Fast, Accurate Threading . . . be Sure to Specify P&W **DIES**

**P**RATT & WHITNEY makes a complete line of thread cutting dies for all purposes . . . and in a full range of sizes. Dies are available for use in hand stocks and for screw machines, turret lathes, bolt cutters, staybolt threading machines, etc. No matter whether it is ordinary threading or fine precision work, we will furnish the correct dies with the quality and accuracy for which Pratt & Whitney has been famed for 85 years. We suggest that you write us for a complete listing and prices . . . or call one of our branch offices — they might have the dies you need right at hand. Remember if our standard dies cannot fit your needs, we can easily give you precision-built dies to your own individual specifications.



The P & W Duocone Die is light, strong, compact . . . designed for machine use. It is inexpensive and does a remarkably fast, accurate job of threading.

## PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD 1, CONNECTICUT



power of your union to force this 30 pct increase in basic wages. Such an increase in our plants would soon spread to the plants of all our suppliers and would affect all elements of cost. Automobiles would shortly cost 30 pct more to produce. Prices to customers would have to be raised 30 pct. If wage raises in automobile plants force such increases in car prices, the market for automobiles would be restricted. Fewer cars would be sold. Fewer people would be able to afford and enjoy them. And fewer workers would be employed in making them."

Calling this a "propaganda statement," as did Mr. Reuther in answer, does not alter the facts and the truth in the case.

Note should be taken of one interesting development which is under way in Detroit attempting to compromise the likelihood that a raise to maintain take-home pay levels would be followed by more overtime work at a then-vast premium.

Two parts companies are now discussing this program. The basis of discussion is, first, a 30 pct pay raise; second, elimination of overtime pay premiums; and, third, guaranteed employment of 40 hr a week for 50 weeks of the year for all employees with five yr. or more seniority.

In this way, the union argues, the parts companies would be able to figure their actual costs closer, inasmuch as no premium pay expense would be involved in overtime periods. The guarantee of annual work is necessitated by the Wage-Hours Act, which calls for overtime pay except where annual wage plans are in effect. The auto union has no hopes of selling such a program to the automobile companies, but it does hope it will be

## Ford Recalling Men

Detroit

• • • Settlement of the 6-week-old strike at Kelsey-Hayes Wheel Co. made it possible to resume Ford passenger car and truck and Ferguson tractor output this week. Men are being called back daily. Whether the total working force can be recalled depends on settlement of strikes at plants of other parts suppliers. Ford people were hopeful that all workers could be called back by next Monday.

able to infiltrate it into the parts plants and then, in a year or two, approach the auto concerns with background and, supposedly, successful experience. Needless to say, the actual amount of the raise involved will not be decided by the parts companies in question until a pattern has been set by the General Motors negotiation.

While its labor officials are negotiating, General Motors production officials are taking pride in the quick changeover they have been effecting. Reconversion work has been going forward at substantial speed, often on 48-hr schedules, and already the 1946 models of Olds, Cadillac and Pontiac were announced in the last few weeks, and Buick's last weekend. On top of that, the first 1946 Chevrolet is reported to have come off the assembly line at the Kansas City plant last week, within three months of the time shell production was halted there.

The new Buicks will be built in three lines, a series 50 Super on 124-in. wheelbase, a series 70 Roadmaster

on 129-in. wheelbase, and a series 40 Special, a volume leader, on 121-in. wheelbase. The series 50, first to be produced, is being made in four body types at the start; and the choices of those four are indicative of the current tightness in sheet steel, because only two of them, the sedan and sedanet, use steel all the way through. The other two are a convertible coupe and six-passenger estate wagon. Of the four, initial production is on the 4-door sedan and the station wagon.

The usual front end changes are provided. A heavy new grille, designed to improve the air flow, is stamped complete from cold rolled steel, with external surfaces capped with chrome plated stainless steel. Bumpers are heavier.

A new means of fabricating cylinder bores has been developed and heads up powerplant improvements. After boring, the cylinders are finished by honing, and then are coated with manganese phosphate, permitting rapid seating of piston rings and giving protection against scuffing during the early life of the engine. Aluminum pistons, not available since 1941, return to the specifications.

A dual downdraft carburetor replaces the double compound units formerly employed, and the intake manifold has been redesigned to accommodate the change. An automatic choke is built into the carburetor.

Wider rim wheels, offered by Buick in 1942 when the use of the wide base rims was still being debated—an advantage now generally recognized—are continued in the 1946 models. Optional high springs, together with 18 x 6.50 wheels and tires are available to owners who want higher road clearance.

## Thompson Buys Tapco Plant

Cleveland

• • • While no official figure has been given out by the Government, Thompson Products, Inc., is reported to be paying about \$4,500,000 for the Tapco plant, second largest war plant constructed and owned by the Government in this area. Company officials asserted acquisition of the plant was virtually a "certainty."

Approximately \$9,000,000 will be spent by Thompson to buy the plant and purchase new equipment. Constructed by the Government less than five years ago, the plant represented an investment of about \$30,000,000, including the cost of land, buildings and machinery. It consists of eight buildings with nearly 1,000,000 sq ft of floor space.



THE 1946 PONTIAC: Advanced styling dominated by the silver streak of past years features the 1946 Pontiac, announced last weekend. A newly designed grille, relocated parking lamps and heavier bumpers, extended outward to protect fender skirts, add nice touches to the new offering.

YOU GET CORROSION RESISTANCE

# Plus ECONOMICAL TROUBLE-FREE FORGINGS WITH *Carpenter* STAINLESS

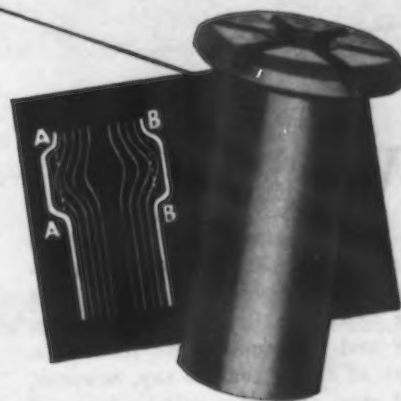


**POSITIVE PROTECTION** against corrosion to withstand the effects of repeated sterilization, plus the required strength and hardness, made Stainless a natural choice for this forged dental instrument. Clean, flawless Stainless forging bars reduced rejects, increased output.

If rejects run high when forging Stainless, it's time to check all along the line. Many factors must be controlled right in the forge shop. But to eliminate trouble and secure best results you must be sure that your forging bars are sound, clean and free from injurious surface defects. Such forging bars assure easiest forging operations and lowest production costs.

At Carpenter, Stainless Steels are made in a tool steel mill to tool steel quality standards. Stainless billets are disc-inspected to assure soundness and homogeneity—and are then *machine-turned* to remove all surface imperfections. By this painstaking process we end up with Stainless bars that, lot after lot, assure economical, trouble-free forgings.

You'll find your nearby Carpenter representative extremely helpful when it comes to finding ways and means of applying Stainless to your postwar products. Back of him stands a company with years of practical experience in solving Stainless problems. Call him in today or write us at the mill . . . And for your copy of our 98-page book "Working Data for Carpenter Stainless Steels" drop us a note on your company letterhead, indicating your title.



**LONGER LIFE.** In spite of tremendous pressures and highly abrasive conditions in service—forged knuckle pins like this stay on the job longer because they are made from Carpenter Stainless. And note in the diagram that forging produced an even grain flow throughout, thus strengthening the thin sections at points AA and BB.

The Carpenter Steel Company • 121 W. Bern Street • Reading, Pa.

## *Carpenter* STAINLESS STEELS



**BRANCHES AT**

Chicago, Cincinnati, Cleveland, Detroit, Hartford,  
Indianapolis, New York, Philadelphia, Providence, St. Louis

...for  
Strength  
Rigidity  
Heat Resistance  
Corrosion Resistance  
Longer Product Life  
Sales Appeal

• Fourth quarter steel production loss likely to be less than expected, says Labor Dept. . . . Ramifications of basing point system may mean new method of pricing automobiles.



**W**ASHINGTON—Fourth quarter steel output is expected to be only 500,000 tons below the pre-VJ-Day estimate of 15.8 million tons unless production is further retarded by labor difficulties such as now confront the petroleum, automotive and communications industries. Dept. of Labor sources say, however, that steel shortages will be few and far between, for any increase in the estimated excess demand of 1.2 million tons under CMP controls will be absorbed by almost complete elimination of the four-fold military requirements.

Employment in the steel industry is expected to increase in the next 90 days. About 60,000 fewer workers are now employed in blast furnaces, steel works and rolling mills than in 1942 when output was approximately the same and the work week averaged 40.2 hr. Even under the 46-48 hr schedule of recent months, openings for upward of 20,000 workers remained unfilled. Consequently, the mills are expected to continue hiring suitable male workers as they become available from the armed forces and other industries.

Although localized manpower shortages may affect a few specific foundry products, reconversion, it is claimed, will not be retarded. The pressure for increased production will be most felt in foundries making cast iron soil

pipe, iron carwheels and railroad brakeshoes, which in the aggregate account for only a small fraction of total foundry production. The easing of military needs for malleable iron castings and steel forgings and castings is also expected to cause a leveling off of employment.

Civilian orders for railroad equipment which are estimated at almost double the 1940 level, it is now said, are not expected to maintain steel foundry employment which has fallen off at an increasing rate since VE-Day.

The production of steel forgings which has greatly increased during the war is likely to incur similar curtailment although increasing demands for automobiles, trucks, railroad equipment and all types of machinery will partly offset the decline.

Gray iron castings producers, although confronted with perhaps the tightest manpower situation, are expected to be in a position to meet requirements of the major reconversion industries including automotive, farm equipment and consumer durable goods. The situation undoubtedly will be helped by reactivation of many captive foundries which were shut down during the war. Sustained demands for ingot molds, pressure pipe, machinery castings and other gray iron items will keep that segment of the industry amply occupied. Technical reconversion problems are at a minimum because old dies used in civilian manufacture can be withdrawn from storage and put to immediate use.

\* \* \*

**S**INCE the Federal Commission is close-mouthed about the whole thing, no authoritative statement can be made of what procedures it may have in mind respecting action against basing point systems. But scuttlebut has it that the Commission will hold with its customary zeal to its traditional f.o.b. production point platform, which to it apparently is as sacrosanct as the decalogue. No Supreme Court decision (and no action taken in Congress) has altered one whit its position that any and all basing point systems, except f.o.b. at point of production, are illegal.

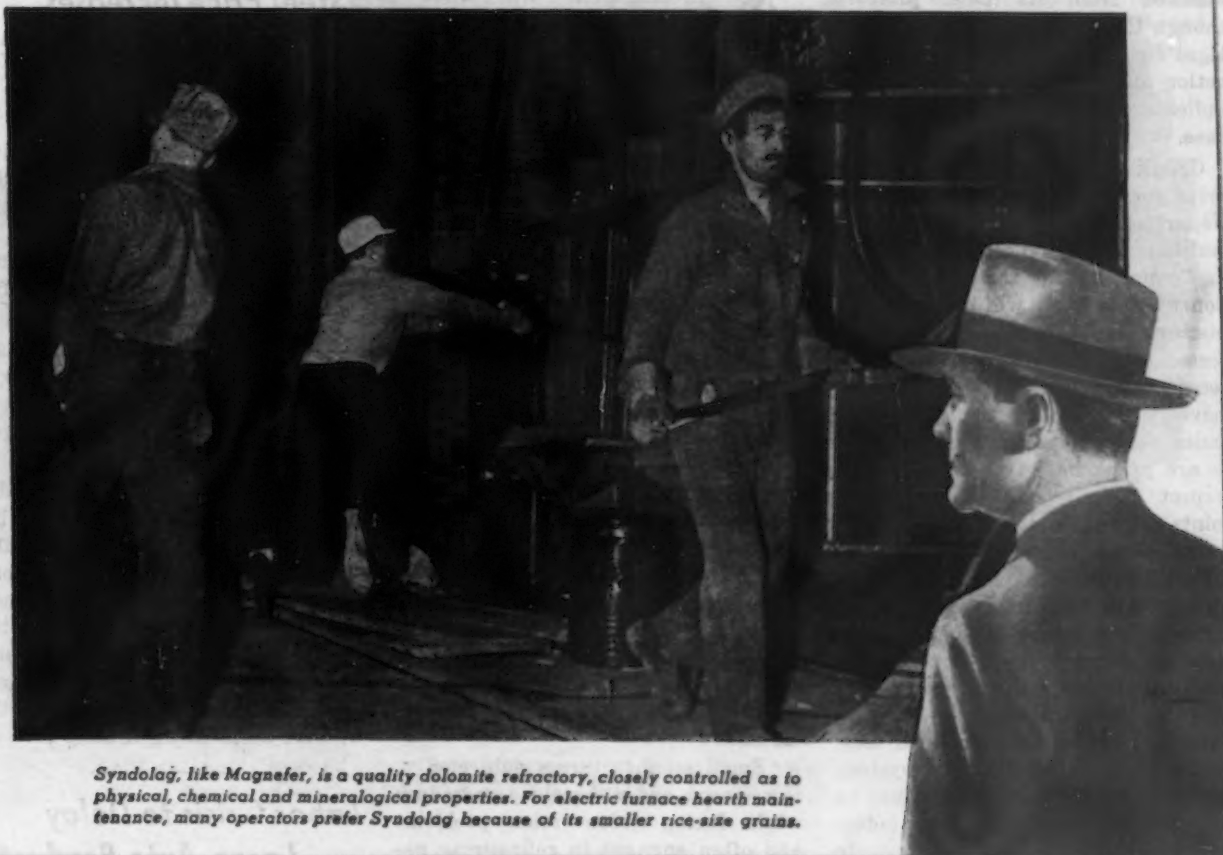
Some have read in the Court's de-



**WORRIED:** Mayor Edward J. Jeffries, Jr., Detroit, right, went to the White House recently to discuss strike problems in his area with President Truman. With him was Senator Homer Ferguson, left, Michigan.

cision in the Corn Products Refining Co. case an inferential approval of the multiple basing point system and even of the single basing point system under certain circumstances, though in reality the Court neither approved nor disapproved any system as such. The definite thing it did was to turn thumbs down on the single basing point system as operated by the Corn Products Refining Co. Likewise the House Committee on the Judiciary in 1936 pigeon-holed the Wheeler-Utterbach Bill which would have required f.o.b. factory pricing. By many this action, noted by the Supreme Court in the Corn Products case, was taken to mean that Congress was opposed to forcing industry to adopt FTC's pet system. By the same token it was taken to be approval of a basing point system or basing point systems, provided they came within the terms of the law. Yet the Committee's action like the Supreme Court's position toward the basing point system itself was not affirmative.

So on this basis the FTC evidently does not think the props have been



*Syndolag, like Magnefer, is a quality dolomite refractory, closely controlled as to physical, chemical and mineralogical properties. For electric furnace hearth maintenance, many operators prefer Syndolag because of its smaller rice-size grains.*

## HEARTH SPECIALIST'S DIAGNOSIS BRINGS RELIEF

**W**HAT'S the cure for an ailing hearth? What relief can you get, for example, if you're troubled with excessive fettling? Or if you have frequent headaches from other refractory ills?

Here's the answer: For hearth trouble, actual or threatened, consult a reliable hearth specialist.

A hearth specialist you can rely on is the Basic Engineer. Always at your call, he diagnoses the case of an ailing hearth and generally has an effective remedy at hand.

Thus, to correct excessive fettling in a basic electric steel furnace, for instance, he often suggests Syndolag. Users of this

rice-size clinkered dolomite find that its small, sharp-angular grains enable Syndolag to stick to steep banks, consolidate quickly in residual furnace heat, set into a dense, durable patch, and so reduce fettling to a desirable minimum.

The Basic Engineer is a practical steel man himself, qualified by experience and training to give you helpful advice on almost any problem of refractory maintenance, repair or construction in the basic electric or basic open hearth furnace. Don't hesitate to call him in to diagnose any case of hearth trouble that may arise in your plant. His prescription may save you time and expense.



**BASIC REFRACTORIES, INCORPORATED** 645 HANNA BUILDING  
Cleveland 15, Ohio

knocked from its f.o.b. platform, though there is a widespread view in legal circles that both the Committee action and the Court decision clearly indicate that the Commission is off base.

Granting that FTC does flop in its drive for f.o.b. mill pricing, like the Department of Justice, it still has the multiple basing point system before it. Coming up for the first Supreme Court action likely will be the Cement Institute case. Precepts that are expected to be laid down by the Court necessarily will guide FTC's further moves. Meantime, industries operating under that system have broadened it or are preparing to do so both with respect to the number of basing points and the products priced at such points. Those that will have done so sufficiently to meet the anticipated decision will of course be free from further Government action. Such a decision obviously will have broad ramifications not only in such industries as steel, cement and lumber, which are ordinarily associated most closely with the basing point system, but in such basic consuming lines as the automotive industry. That industry might well be required to quote on the basis of assembly location nearest to points of delivery in place of exclusively basing prices on points of production.

**A**N investigation into what is termed "War Dept. high-handed methods in collecting renegotiation claims" has been undertaken by the House Small Business Committee.

The Committee reports that during wartime the military services were relatively lenient in the collection of renegotiation accounts from small manufacturers. In many instances firms were given more than a year to liquidate their account through installment payments.

With the arrival of VJ-Day the War Dept. has instituted a new policy of immediately certifying unilateral determinations to the Dept. of Justice for collection, according to the Committee. Prior to certification to Justice, however, the Finance Div. of the War Dept. now issues a directive to all customers of the manufacturer ordering the withholding, for the account of the United States, of any and all amounts due or to become due to the manufacturer in an amount equal to the value of the renegotiation claim.

"Small manufacturers subjected to this strong and unheralded procedure while facing reconversion problems and often engaged in refinancing negotiations, find themselves seriously embarrassed not only with their customers but also with their banking connections," says the Committee.

## Steel Price Increases Depend on Wage Action

Washington

• • • The long expected steel price adjustments have been tentatively agreed on, OPA sources say, but are being held up until the administration's wage policy is clarified. This matter remains to be worked out with OWMR on whose action OPA's future course depends.

The new formula, it was explained, takes into consideration the cost data submitted by steel producers but does not include provisions for wage increases.

The inability of industry to absorb wage increases at present price levels was pointed out by WPB chairman J. A. Krug at a recent press conference. While admitting that some industries might be in a position to increase wages without raising prices, Mr. Krug stated that the steel industry could not increase wages without upward adjustment of steel prices.

## Labor Crisis to Delay Large Auto Production

Washington

• • • According to present WPB estimates, labor troubles in the automotive and related industries have completely nullified prospects for getting 450,000 passenger cars by the end of the year. WPB says that if all labor troubles were straightened out immediately, approximately 300,000 cars might be produced. If the labor crisis doesn't ease, the best that can be hoped for is 50,000.

OPA is noncommittal in regard to prices for new cars but it has been revealed that Studebaker has already filed its 1946 prices. Conforming to industry practices, OPA will not release these prices but says that they are "generally fair in regard to 1942 prices."

## OPA Studies Steel Casting Price Setup

Washington

• • • Producers of steel castings and railroad specialties were authorized by OPA, effective Oct. 5, to deliver these commodities at prices that may be adjusted upward not more than 15 pct if increases over present ceilings are subsequently permitted by that agency.

## THE BULL OF THE WOODS

BY J. R. WILLIAMS



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THREADS 8 TO 32 PITCH,  
STOCK FOR IMMEDIATE DELIVERY

CRUSHER ROLLS FOR SPECIAL THREADS  
AND ANY TYPE OF PRECISION FORM CAN  
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POWER CRUSHING DEVICE FOR USE ON  
A SURFACE GRINDER.

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Grinding with crush dressed wheels has so many advantages from the standpoints of accuracy, speed, and economy that it took little time for it to become firmly established in the metal working industry. Sheffield, the American pioneer of this practice on a commercial basis, can furnish you with the equipment you need to put it into operation in your own plant.

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SHEFFIELD THREAD AND FORM GRINDER FOR  
THE ACCURATE CRUSHING OF WHEELS.

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THREADED OR FORMED.

SHEFFIELD MICRO-FORM GRINDER  
PRODUCING THE ORIGINAL  
CRUSHER ROLL, FLAT OR CIRCULAR  
FORM TOOLS AND PROFILES OF ALL  
KINDS.

THE SHEFFIELD CORPORATION



• Demand for single civilian surplus property committee grows . . . Declared defense against inflation and depression . . . Boeing product diversification rumored.



**S**AN FRANCISCO—"Planners of the national economy have completely failed to grasp the concept of this surplus problem as it affects the total economy of the nation," according to one western industrialist. "It is even more pressing on the Pacific Coast than elsewhere because we have enjoyed—or suffered—the greatest mass migration the country has ever seen. This problem is one of distribution, not production, as it was during the war years.

"We're teetering on the edge of a two-way precipice. On one side we're threatened with inflation because there are more goods than dollars. On the other hand we're on the verge of depression because of unemployment largely due to material shortages.

"What we need to do is to release the vast quantities of surplus goods already produced and absorb some of these surplus dollars. At the same time we would be combating deflation and unemployment as we put men to work processing and distributing these goods, which again in turn would absorb inflationary dollars. If we don't, Heaven only knows how we'll take care of the two-and-a-half million addition to our Western population and more than a million prospective unemployed.

"One of the best ways this can be

accomplished is to get the stuff declared surplus. The material and equipment which is on record is only a drop in the bucket compared to the total being held by the Army, Navy, Marine Corps and Maritime Commission. All these agencies will tell you that they know what they have and are declaring it. The truth is that they don't begin to know and for various reasons don't even want to declare it.

"Under these circumstances there is only one person in the country who can force the military and government agencies to do so and that is their commander-in-chief, the President himself. By appointing a civilian committee to dig out this excess stock and report it to Washington, direct and fast, we may be able to get it into civilian production, otherwise it's going to hang over the market for years and may never get there.

"On the West Coast the Army alone has 15 million sq ft of civilian storage space; 85 pct of this is in the three Western states and the bulk of that is in the industrial centers at tidewater. The Navy has 400,000 sq ft of private storage space in the Bay Area alone, and God knows how much the Marines have. How on earth can business get goods back in normal trade channels when there's no place to store it, and the very items which are holding up the works have already been produced and are being hoarded in every Army and Navy depot in the West?"

The multiple basing point recently announced for stainless steel will benefit the Coast more in theory than in fact according to local advice. This commodity represents about 2 pct of Western steel volume and the price reduction will work out to a saving of about  $\frac{1}{2}$ ¢ lb.

Pacific Coast boilermakers have recently agreed to increases amounting to approximately six pct. for the ensuing year. The agreement is to go to the Wage Adjustment Board for approval. The California Metal Trades Assn. feels that "establishment of uniform conditions for any operator in the seven Western states is a decided step forward."

Other developments on the local labor front include demands by CIO machinists local 1304, with headquar-

ters in Oakland, for a 30 pct increase, and a strike vote scheduled by the AFL machinists local 68. If, as the labor grapevine reports, the irrepressible Messers. Hook and Dillon, heads of the AFL union force a repetition of their wartime walkout, Bay Area conversion will receive a setback directly affecting an estimated 80,000 employees.

**A** FAIR index to current estimates of the industrial outlook in the West is furnished by the plaintive report of the 10th Regional OPA which declares it is ready to process price applications at top speed—10 days. Expected number of applicants from VJ-Day to date was 1800. Total number received so far is 31, none of which was in heavy industry or durable goods.

Second straw-in-the-wind occurred at the recent joint meeting of the Western States Building Industry Conference Board held here recently. Attendance from the steel industry was remarkably low. Delivery date quotations from the fabricating industries were: Bathtubs, six months; soil pipe, seven to eight months; copper tubing, forgings and castings, six months; electrical equipment, one year; and small motors, 80 weeks.

Recovering from its surprise at the news of the Consolidated Steel-Western Pipe & Steel merger, Steel Row is busy with pencil and paper trying to figure its effect on sources of supply. In prewar times both firms split their business pretty evenly between the two major suppliers with a "satisfactory" volume from eastern mill representatives. Now constituting one of the largest single buyers on the Coast the industry wonders what effect the merger will have.

With Bethlehem's fabricating division in competition with the consolidation, observers feel that Bethlehem is in a fair position to hold its share of the volume. Columbia men aren't going to hesitate to remind Consolidated that Columbia wouldn't think of competing with them and should continue to sell their share. The advantages of warehouse purchasing will still hold good so both eastern mills and warehousemen expect to hold their volume. On the face of it the situa-

2500

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Valve stem ends TOCCO-hardened to depth of  $\frac{3}{8}$ ". Hardness of 50 Rockwell "C" accurately controlled.

2000 PISTON PINS PER HOUR. Continuous hardening of carburized piston pins to 62 Rockwell "C". Pins TOCCO-hardened free of distortion and scale.

300 AXLE SHAFT BEARING RACES PER HOUR. Hardens axle bearing to 62 Rockwell "C". Eliminates inner race formerly pressed on. Gives 50% more strength.

500 DISTRIBUTOR CAMS PER HOUR. Cam surfaces TOCCO-hardened to 62 Rockwell "C" after assembly eliminating copper plating.

100 ROCKER SHAFTS PER HOUR. TOCCO-hardened at six areas per shaft. TOCCO fixture accommodates shafts 14" to 36" in length, having 6 to 12 hardened areas. No scale or distortion.

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Speedy, accurate TOCCO Induction Hardening enables you to produce better products, faster, at a fraction of the cost of conventional heat-treating. One manufacturer gets such results for 142 different parts . . . with one standard TOCCO machine! Fixtures are readily changed, permitting quick tool-up to suit the job.

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THE OHIO CRANKSHAFT COMPANY • Cleveland 1, Ohio

**INDUCTION**

**HARDENING, BRAZING  
ANNEALING, HEATING**

**TOCCO**

tion appears unchanged. However President Alden Roach is a great exponent of lower steel prices for the Pacific Coast and may be expected to encourage a competitive condition by throwing some business to Fontana. The latter firm is expected to go all out for a major share of the business from such an important single source.

Most steel men believe that once the immediate adjustment period is surmounted there will be more than enough business for everyone. So for the short term they are not greatly concerned about their share of Consolidated's tonnage. Best guess as to effect after the heyday is that everyone will still sit down to dinner—with one or two extra places at the table.

This estimate almost excludes Geneva from the picture as informed local people doubt if U.S. Steel will bid again. (See THE IRON AGE, Sept. 20 p. 110). With either shutdown or acquisition by CF & I imminent, observers claim the puzzle gets too complicated at this point and would require second sight to solve it.

**LOS ANGELES**—Lockheed Aircraft Corp., is beginning to emerge as one of the happiest of Southern California's aircraft plants. As a Constellation breaks the cross-country record of 10 hr and 10 min by 2 hr 27 min with a transcontinental flying time from Burbank to Miami of 7 hr 53 min, president Robert E. Gross cheered stockholders with the announcement of the company's pros-

pective volume for the coming year.

Backlog in sight totals \$259 million with \$137 million from commercial orders, \$75 million military, and the balance conditional orders. Working capital exceeds \$32 million, an increase of \$8,500,000 over December, 1944, attributable largely to a tax refund of \$5,850,000.

Kinner Motors Inc., has bought the Kinney Iron Works, one of the oldest and biggest foundries in the South. In addition to its regular business this firm is also Western licensee for Meehanite.

Kinner is just getting into production with a 5 hp industrial engine and is planning other models from 2½ up to 15 hp as well as the new Kinner airplane engine line. In this category the firm has a new 65 hp model undergoing tests.

Simultaneously, the manufacturing division which has acquired a line of 20 items from the Gladden Products Co., headed by Kinner's president John Gladden, will change its name to that of the newly consolidated company.

Despite the strikes and business dislocations affecting the automotive industry, General Motors is proceeding with its plans for expansion at South Gate. Major contracts have been let for the construction and equipment replacement program. Floor space is being increased from 718,000 sq ft to 1,075,000, and the payroll is scheduled

to rise from the present 700 to 3000 by Jan. 1. Production capacity will be 40 automobiles per hr.

**SEATTLE**—Boeing Aircraft Co., has plans well underway for two new transport planes designated "417" and "431" in addition to its Stratoliner. The 417 is a high-wing, twin-engine plane designed especially for feeder line operations. It is designed to carry 20 passengers, carry a payload of 6190 lbs, have a top speed of 243 miles, cruising speed of 200 and have a range in excess of 1000 miles. The second plane will also be high-winged and twin-engined. It is built to replace present two-engine equipment in use on domestic airlines. Performance figures for the 431 are: cruising speed, 252 miles; maximum, 287; payload 8000 lb; passenger capacity, 30 to 40. Direct operating costs for both planes is estimated by the company at 10 to 12c per mile.

Boeing officials equivocally declare that the company will "concentrate primarily on aircraft" while current issues of the Patent Office Gazette list applications for design patents for a rear-engine type automobile under the name of Ed Wells, Boeing chief engineer.

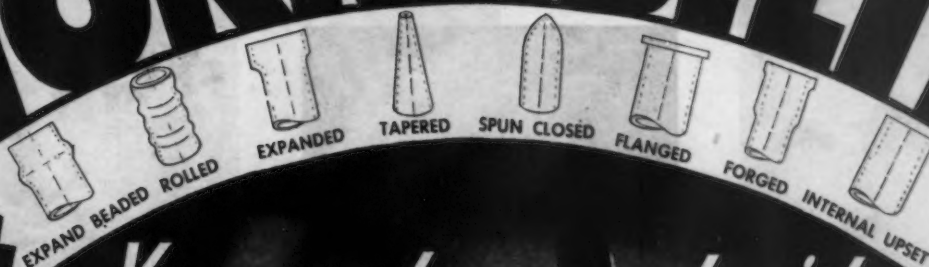
Western manufacturing circles don't seriously believe that Boeing might attempt to manufacture and distribute automobiles from the northwest but think where there is unnecessary smoke, there should be fire. Lockheed in Los Angeles is likewise understood to have explored intensively the possibility of entering the electrical appliance field and to have abandoned the project as economically speculative. Boeing, or Mr. Wells, have apparently gone one step further than Lockheed, but traffic men still discount it. At the same time the "concentrate primarily" wording of the company's recent statement fails to allay speculation as to the firm's plans to utilize excess capacity.

The Boeing-Renton plant and three other Seattle war plants have been placed on the surplus property list by the RFC. The Renton plant has been declared surplus almost in its entirety, as well as small units of the company's Seattle plant. Pacific Car & Foundry has also had an office building, ordnance proving ground and foundry at Renton declared surplus, as has the Lake Washington Shipyard at Houghton, and one of the Stetson-Ross Machine plants.

**FIELD REPAIR:** This truck-mounted field welding unit for on-the-spot repairs is operated by the Johnson Tractor Co., Riverside, Calif.



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SIZES  
1/4 to 4"  
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**ROUND • SQUARE • RECTANGULAR  
and SPECIAL SHAPES**

Michigan welded steel tube can be flanged, expanded, cold drawn, fluted, flattened, bent, coiled, upset, beaded, grooved, rolled, spun, threaded, tapered, and shaped to

meet every manufacturing demand. • Available in commercial mill lengths or cut to specified lengths, shaped and fabricated, ready for assembly.

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# PERSONALS



**W. E. MULLESTEIN**, manager of Coatesville district sales, Lukens Steel Co.

• **W. E. Mullestein** has been named manager of Coatesville district sales of Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., Coatesville, Pa. Previously, Mr. Mullestein was acting assistant sales manager of Lukenweld, Inc.

• **Richard F. Sentner** has been appointed an assistant general sales manager of the Wheeling Steel Corp., Wheeling, W. Va. Mr. Sentner had been manager of Tin Plate Sales Div. since 1941, and during the past three years had been with the War Production Board in Washington. **Leslie Irvine** has been appointed to succeed Mr. Sentner as manager of the Tin Plate Sales Div.

• **William Sheldrick**, treasurer and assistant secretary of the Babcock & Wilcox Co. and the Babcock & Wilcox Tube Co., New York, has retired from active service. **W. G. Dryden** succeeds to these positions.

• **Marshall B. Taft**, formerly of the Aero Div., Minneapolis-Honeywell Regulator Co., has been made assistant to **Henry F. Dever**, president of the Brown Instrument Co., Philadelphia Industrial Div. of the Honeywell organization.

• **Robert W. Burnham** has been appointed factory manager of Kaydon Engineering Corp., Muskegon, Mich. **Maurice Jensen** has been appointed general superintendent.

• **Harold C. Norman**, former sales manager, has been promoted to general manager of the Hein-Werner Motor Parts Co., Waukesha, Wis.



**WILLIAM McNEAR RAND**, president, Monsanto Chemical Co.

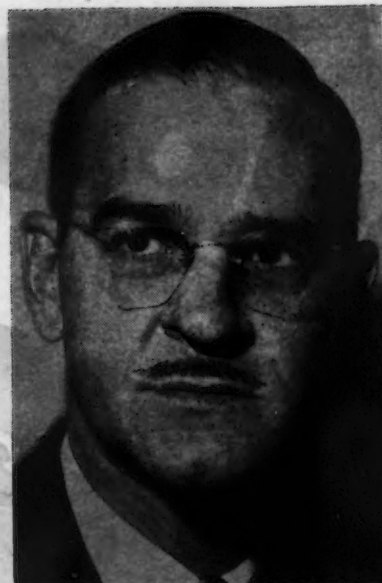
• **William McNear Rand** has been elected president of Monsanto Chemical Co., St. Louis, succeeding **Charles Belknap**, who will continue with the company as chairman of its executive committee. Mr. Rand came to Monsanto through the Merrimac Chemical Co., which Monsanto acquired in 1929 where he had served successively as treasurer, sales vice-president and treasurer, executive vice-president and president. When Merrimac was liquidated as a separate corporation in 1937 he became general manager of the Merrimac Div. and vice-president of Monsanto.

• **U. R. Jaeger** has been named sales engineer in the New York district of the Industrial Div., Aluminum Industries, Inc., Cincinnati.

• **T. S. Bowie** has been appointed director of basic plan of Liberty Distributors, Philadelphia, and **Val G. Jurgell**, director of promotion.

• **R. P. Campbell** has been appointed Missouri district sales manager of Wheelco Instruments Co., Chicago.

• **C. N. Schmidt** has been appointed advertising manager of the American Steel & Wire Co., Cleveland, U. S. Steel Corp. subsidiary. **Wilmer H. Cordes**, manager of sales research, development and promotion, will devote his full attention to those responsibilities by relinquishing the position which Mr. Schmidt now assumes.



**FREDERICK L. WARNKE**, assistant comptroller, U. S. Steel Supply Co.

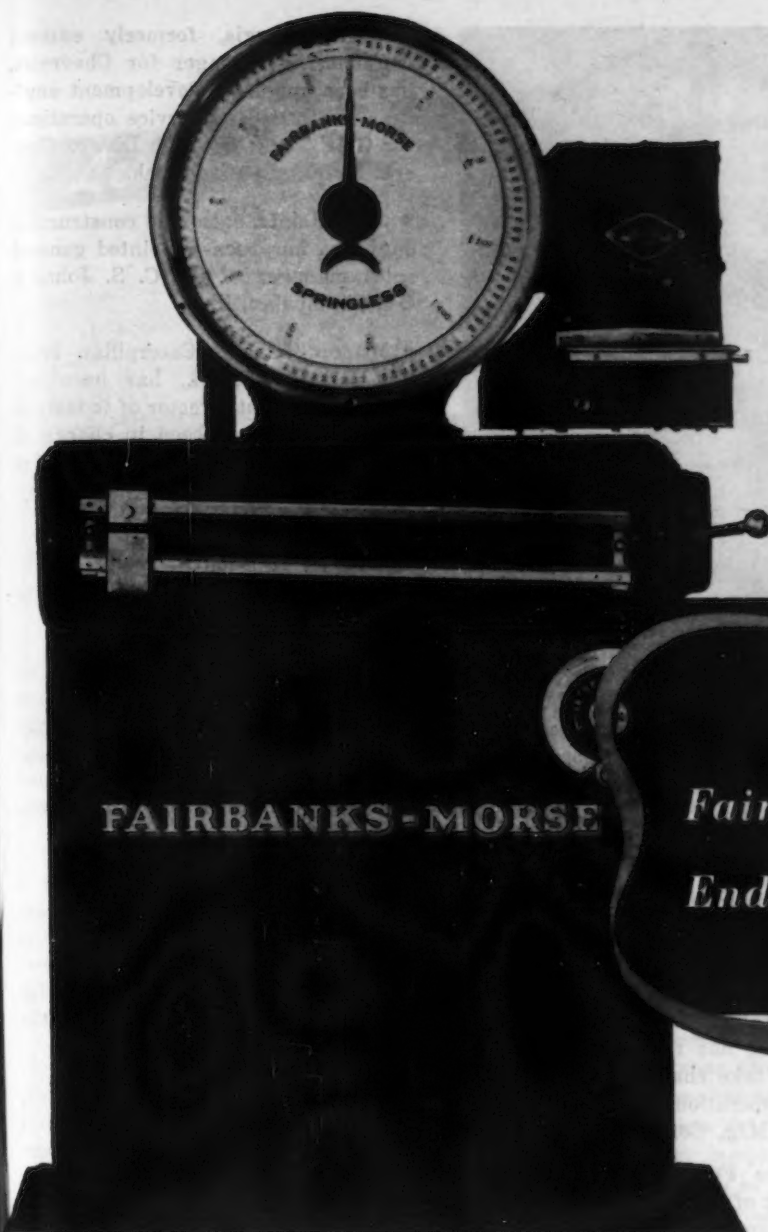
• **Frederick L. Warnke** has been appointed assistant comptroller, U. S. Steel Supply Co., Chicago, with which he has been affiliated since October 1944. He previously was employed in the finance dept. of the Pittsburgh general offices of Carnegie-Illinois Steel Corp.

• **William A. Elliott**, formerly executive vice-president, has been elected president of the Elliott Co., Jeanette, Pa. He succeeds **Grant B. Shipley**, who retains the post of chairman of the board. **F. H. Stohr**, formerly assistant to the president, has been made executive vice-president, and **F. W. Dohring**, who had been general sales manager, has been chosen vice-president in charge of sales.

• **John C. Smith**, formerly manager of manufacturing at the Canton, Ohio, Naval Ordnance plant, has been appointed works manager of the Westinghouse Electric Corp., Center Line, Mich. **William G. Miller** has been named to succeed Mr. Smith as manager of manufacturing at the Ohio works.

• **J. Cleveland McKenna**, director and metallurgist of the Vanadium-Alloys Steel Co., of Latrobe, Pa., has been appointed advertising manager to replace **Lawrence Wood**, resigned.

• **Robert B. McColl** has been elected executive vice-president of American Locomotive Co., New York. Mr. McColl is succeeded as vice-president in charge of manufacturing by **W. L. Lentz** of Schenectady who directed the company's tank and locomotive manufacturing program there the past five years.



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Fairbanks-Morse Scales  
Enduring *Accuracy*

**F**airbanks-Morse Scales have earned their world-wide reputation for enduring accuracy through constant research to improve even the most minute parts—through research in the selection of the most enduring materials—through research in design to perfect each part. This has been the Fairbanks-Morse policy for over a hundred years, and it continues

to be the Fairbanks-Morse policy today.

Skilled craftsmen produce these parts with the aid of modern machines. Trained assemblers put them together. A weighing machine so constructed performs accurately day after day, year after year.

Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.

# Fairbanks-Morse

A name worth remembering



Diesel Locomotives • Diesel Engines  
Scales • Motors • Pumps • Generators  
Magnetos • Stokers • Railroad Motor  
Cars and Standpipes • Farm Equipment

- **John H. Frye** has been appointed general manager of sales of Columbia Steel & Shafting Co., Pittsburgh. Mr. Frye has been associated with the company since 1927 in the capacity of manager of sales at Detroit and metallurgical engineer at Pittsburgh. For the last five years he has been on leave of absence serving with the U. S. Army. Assisting Mr. Frye in sales administration will be R. H. Shirk and Harry B. Reno, Jr., both assistant general manager of sales.

- **Raymond W. Young**, chief engineer of Wright Aeronautical Corp., Paterson, N. J., since 1940, has been appointed vice-president in charge of engineering.

- **L. Alan Sharp** has returned to the National Electric Products Corp., Pittsburgh, in the capacity of designing engineer after having served in the Army.

- **Arthur R. Tofte** has been named manager of the advertising and public relations dept., Allis-Chalmers Mfg. Co., Milwaukee. He succeeds George J. Callos, who resigned to become vice-president and account executive for Klau-Van Pieterston-Dunlap Associates, Inc., Milwaukee advertising agency.

- **Leo B. McCoy** has been appointed sales representative in the New Jersey territory for Janitrol gas-fired furnaces and burners, Surface Combustion Corp., Toledo. Carl H. Langendorf has been appointed sales and service engineer for the St. Louis territory.

- **Roy A. Bass** has been appointed director of distribution for Dresser Industries, Inc. He was previously Buffalo district sales manager for Ross Heater & Mfg. Co., Inc., and has been active in sales and marketing for many years.

- **Earl R. Preble** has been elected vice-president in charge of merchandising service of the Griswold-Eshleman Co., Cleveland.

- **E. Eugene Adams**, pioneer designer of lightweight streamline trains and who has been associated with the railroad industry for 40 years, has retired as vice-president in charge of transportation research for Pullman, Inc., and the Pullman Co., Chicago.

- **William J. Chovanec**, formerly a member of the engineering staff, has been appointed district sales manager for the Cincinnati territory of the Cleveland Automatic Machine Co., Cleveland.



**FLOYD ROSE**, chairman of the board, Firth-Sterling Steel Co.

- **Floyd Rose**, formerly president of Vanadium-Alloys Steel Co., has been elected chairman of the board of Firth-Sterling Steel Co., McKeesport, Pa. Mr. Rose had been with Vanadium-Alloys Steel Co. since 1926, and prior to that had been vice-president of the Heppenstall Co.

- **Andre Baudat**, formerly supervisor of equipment engineering at the Boeing Aircraft Co. of Canada in Vancouver, B. C., has resigned his position there to take charge of all manufacturing operations for the Sweden Freezer Mfg. Co. of Seattle.

- **George Fobian** has been elected president of the Oilgear Co., Milwaukee, to succeed the late Harry M. Swigart. He started with the firm in 1923 in the engineering dept., later became sales manager, and in 1939 was elected a vice-president.

- **Walter Frame**, president of the Waukesha (Wis.) National Bank, has been elected a director of the Waukesha Motor Co. C. P. Ross, treasurer and formerly assistant secretary, has been named secretary.

- **Walter P. Schwarm**, general sales manager of Milcor Steel Co., Milwaukee, subsidiary of Inland Steel Co. Chicago, has been elected vice-president in charge of sales at Milcor. Robert S. Schmieder, manager of the Milcor Baltimore office, has been made general sales manager to succeed Mr. Schwarm.

- **George F. Goodyear**, patent attorney, has joined the executive staff of Hewitt Rubber Corp., Buffalo, where he is assuming the responsibility of assistant secretary.

- **Grant Sturgis**, formerly eastern warehousing manager for Chevrolet, has been appointed development engineer for parts and service operations for GMC Truck & Coach Div. of General Motors, Pontiac, Mich.

- **J. H. Heintz**, sales and construction engineer, has been appointed general sales manager of the C. S. Johnson Co., Champaign, Ill.

- **Warren Kinsey**, Caterpillar Tractor Co., Peoria, Ill., has been appointed assistant director of industrial relations. He has been in charge of industrial relations at the Caterpillar Military Engine Co., a subsidiary, since 1942.

- **Leonard C. Doolittle** has been appointed industrial hose sales engineer of the Weatherhead Co., Cleveland.

- **L. B. Keplinger** has resigned as vice-president and director of Rheem Mfg. Co., New York. Mr. Keplinger leaves to assume his duties as president and general manager of the Steel Shipping Container Institute, Inc., New York.

- **Robert E. O'Brien** has become a member of the Pittsburgh sales organization of the Heppenstall Co. Since 1930, Mr. O'Brien has been employed in operational capacities for both Bethlehem Steel Co. and the Jones & Laughlin Steel Corp.

- **Charles E. Lehr**, chief engineer, Bethlehem, Pa. plant, Bethlehem Steel Co., has retired after 54 years of service with the company and its predecessor, Bethlehem Iron Co. His successor is John A. Taylor, formerly superintendent, Lower Mfg. Shops.

- **Lieut. Franklin P. Clark**, recently of the Navy Bureau of Supplies and Accounts, has been appointed sales manager of the Upson-Walton Co., Cleveland.

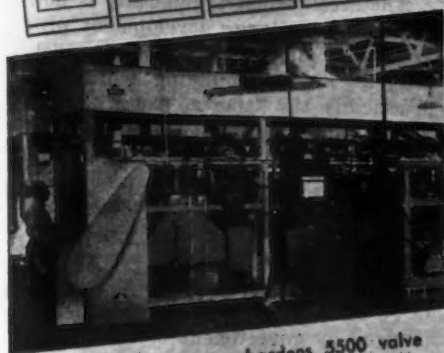
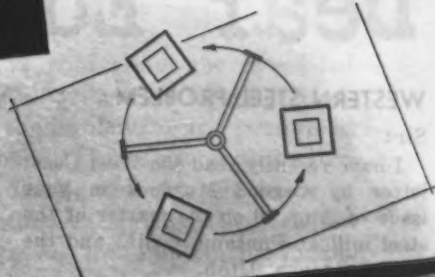
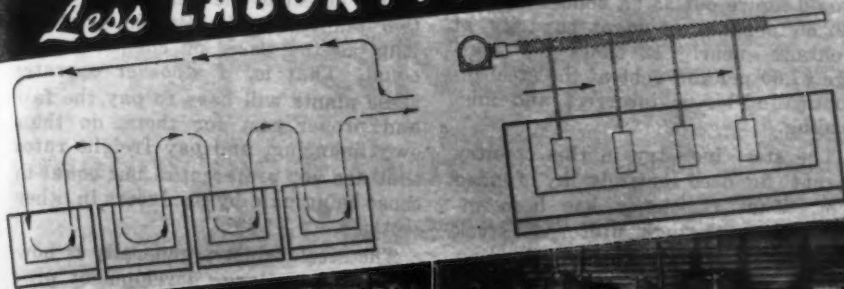
- **W. Clifford Morrison** has been appointed district sales manager of the New York office of Milton Mfg. Co., Milton, Pa.

## OBITUARY...

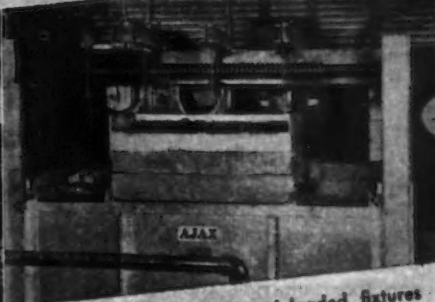
- **George MacDonald**, 47, assistant treasurer of Gilbert & Barker Mfg. Co., Springfield, Mass., died suddenly in Worcester, Sept. 27.

- **Harry W. Doran**, purchasing agent for the Detroit Diesel Div. of General Motors Corp., died recently.

**Less LABOR . . . More OUTPUT**



1 man selectively case hardens 5500 valve pusher rods in 1 hour.



Conveyor screw moves work-loaded fixtures thru carburizing bath at maximum speed.



"Carousel" design speeds-up selective carburizing ends of boiler stay bolts.

# Mechanized SALT BATHS for LOW-COST PRODUCTION

## Technical Literature Available on Request

- ☐ "Liquid Carburizing Transmission Gears" W. A. SILLIMAN
- ☐ "Merits of Salt Baths and Air Furnaces for Treating Aluminum Alloys" JAMES SNIDER
- ☐ "Isothermal Quench Baths Applied to Commercial Practice" H. J. BABCOCK
- ☐ "Salt Bath Hardening of NE Steels" L. J. SHEEHAN
- ☐ "Hardening High Speed Taps and Dies in the Electric Salt Bath" P. C. FARREN
- ☐ "Carburizing Gears in the Electric Salt Bath Furnace" W. F. SORENSON
- ☐ "Electric Salt Bath Treatment of Aluminum Aircraft Alloys" C. SANTORE
- ☐ "Salt Bath Quenching Processes" H. J. BABCOCK
- ☐ "Ajax-Hultgren Electric Salt Bath Furnaces" CATALOG 107B

By overcoming the inherent deficiencies in *externally* heated salt baths (size, shape, limitations and short life of pots, plus excessive fuming and low operating efficiency), the Ajax *internally* heated salt bath furnace has made complete mechanization of *hundreds\** of heat-treated processes possible. Now . . . heat, quench, wash and dry . . . in automatic sequence! The Ajax method improves quality thru elimination of uneven heating and distortion by individual, uniform, cyclic treatment (differentially heated if desired) of each piece, hung vertically in fixtures. A thin film of salt protects the work surface at all times, preventing decarb, scale and pitting . . . no special atmosphere needed, since the salt bath controls atmosphere by eliminating it. Ajax immersed electrodes develop electromotive circulation of the bath . . . heating 4 to 6 times faster than radiation or convection type systems . . . requiring correspondingly less floor space and spectacularly extending the life of ceramic or metallic pots (which may be shaped at will for the work involved). Process engineers with an eye to the post-war competitive market are discarding "batch type" planning for the modern, proven Ajax system. Our staff is competent and ready to offer its thorough assistance.

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**AJAX ELECTRIC COMPANY, INC.**

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**THE AJAX ELECTRIC SALT BATH FURNACE HULTGREN**

Associate Companies: Ajax Metal Co. • Ajax Electric Furnace Corp. • Ajax Engineering Corp. • Ajax Electrothermic Corp.

# Dear Editor:

## WESTERN STEEL PROBLEM

Sir:

I have recently read the West Coast letter by Osgood Murdock in your issue of Aug. 30 on the matter of the steel mill at Fontana, Calif., and the one at Geneva, Utah.

The gossipy tone of this letter on a subject so important seems entirely out of place in THE IRON AGE, which always, in my experience with it over the years, has endeavored to present a true picture of the steel industry's problems.

For instance, in the first paragraph, Mr. Kenneth Norris is quoted as saying that there should be a boycott of eastern steel interests and local mills that are "blocking the West from breaking the steel differential." It seems to me that a check should have been made as to what Mr. Norris meant, in detail, if in fact he made such a statement. Who are the interests who are doing the blocking, and what is meant by the steel differential?

Frankly, I have never heard a steel producer take any position against the two western plants, nor do I think they have ever considered the West as outside of the United States. Steel manufacturers have always been greatly interested in selling all the steel possible to the western states, and at the lowest possible price, just the same as to every other state, and the development there proves this.

I made some comments myself recently on this general situation, but only to point out that these western plants should not be financed by the government because that was not the function of the government any more than it is a government function to take over the burden of financing production in other parts of the country. The plants were built strictly for war purposes. That purpose having been served, they should now be sold to private capital on a basis of what it might cost to reproduce these plants. When I say private capital I mean no matter where located.

Apparently propaganda has been developed on the Coast by some interests to support the proposition that eastern steel producers should not be allowed to bid on the properties. I consider this strictly un-American, because, to begin with, the money required to build these plants, amounting to about \$300,000,000, was supplied by all sections of the country and not solely by the West.

The statement is made that the first mortgage suggested by the RFC

would figure out as "a bonded debt of \$92.56 per ton of ingot capacity at Fontana—nearly 12 times the average \$7.60 per ton debt of the steel industry." This is incorrect and misleading.

The steel industry in this country is not financed entirely by funded debt. That is, money has been invested also through preferred stock and common stock. The nine leading companies have a total in bonds, preferred stock and common stock of \$3,639,791,961 of which only 15 pct is represented by funded debt. But the total is an investment on the part of the public and is equal to slightly less than \$50 per ton of ingot capacity.

Another statement in this same paragraph is that "Fontana must earn fixed charges of more than \$7 per ton of ingot capacity or twice the total per ton earnings of the steel industry." This is not a fair comparison because one item is before taxes and the other is after taxes.

Another statement is the following: "Quite aside from the possibility of some mild competition for business and resultant curtailed profits when Coast manufacturing plants get down to business, where, businessmen ask, does that leave the West?" Just what is meant by this paragraph?

Reference is made to a bonded debt for the two western steel plants of \$198,500,000 at rates of 8 pct amounting to \$1,600,000 in annual carrying charges alone. According to my method of calculating this should be \$16,000,000. The rate is probably incorrect also.

Reference is made that Fontana is said to be able to make a profit of \$9,000,000 with operations at 80 pct of capacity and is followed by the indefinite statement that this figure *might have been* before taxes and other charges.

The next paragraph refers to Fontana having a cost of \$25 to \$26 on ingots. Inasmuch as ingots are not sold to the public, the real question is—what is the cost of the finished material? Certainly these costs do not include return on investment, interest, depreciation, etc., so that they are valueless as a comparison. Also reference is made to the statement that certain rolling equipment was withheld from Fontana which, of course, was absolutely not true.

I am simply giving these different references to show the type of statement that you have printed. Not that you have taken any responsibility for the authenticity of the remarks, but nevertheless their quotation in THE

IRON AGE does give them some substance.

The real facts are that steel producers in other sections of the country do not object to the competition of the two plants on the Pacific Coast as long as the basis of competition is equal. That is, if whoever operates these plants will have to pay the fair and proper cost for them, do their own financing, and pay freight rates that are not preferential but equal to those being paid by producers in other sections.

The steel industry generally is now working on a large development program involving many millions of dollars, at costs of building which are practically the same as those applied to the Fontana and Geneva plants. In other words, we are spending our own money on this basis and inasmuch as we are all part of the United States we see no reason why any section should be favored by having property given to them at very much lower costs than now exist, by being financed by government or state, and by having preferential freight rates. On this basis of equality, which in the long run should apply, finished steel cannot be supplied by Pacific Coast producers at a price less than they are now receiving from producers in other sections of the country.

There apparently has been a great deal of untrue propaganda about this situation on the Coast. It would have been much more constructive for THE IRON AGE to have made a careful investigation, and to have presented the facts rather than to publish the type of article to which I have taken exception in this letter. You would have no trouble getting the facts, because I think any of the steel companies which have made a study of this situation would be very glad to furnish you with whatever information you require.

E. T. WEIR,  
Chairman

National Steel Corp.,  
Pittsburgh

● We certainly agree with all of your contentions and on several occasions have been only too blunt in making similar points ourselves.

However, it is our function to report sentiment as it exists in various sections of the country. We must necessarily and honestly report in our West Coast column what West Coast people think. It may be incorrect; it may be loose thinking; it may be selfish thinking; but how is the remainder of the country to know what is being thought if we do not report it.

The bulk of the West Coast column was direct quotes of Kenneth Norris, president of the Norris Stamping Co., and chairman of the steel committee of the Western States Council, and as such was news. The balance of the article did not deal in quotes but dealt primarily in stated sentiments, thoughts and attitudes. And here again they serve a function as the background of thinking in that area.—Ed.

# A SPRING

means more than  
just a season  
-to the Ford Tractor  
with Ferguson System!



**P**ERHAPS you've read about the new Ford Tractor—Ferguson System of farming. How the tractor pulls the implement at a prescribed depth in the ground. This is accomplished by an ingenious hydraulic control, the heart of which is a Muehlhausen Spring. Any variation of the resistance on the implement in the ground causes a flexing of this spring, which, in turn, controls the amount of oil in the hydraulic cylinder, thus holding the implement at a fixed depth.

Manufacturing tolerances are extremely exacting, especially for a hot-coiled spring. Length must be held to 3/64 of an inch and the load within 5%.

This well-engineered spring is a product of the Muehlhausen modern hot-coiling plant, which specializes in heavy springs made to precision tolerances.

**MUEHLHAUSEN SPRING CORPORATION**  
Division of Standard Steel Spring Company  
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### Designed SPRINGS



WRITE FOR  
LARGE SPRING FOLDER!  
Showing the extensive  
facilities at Muehl-  
hausen for making  
large springs.

# This Industrial Week . . .

- **Steel Deliveries Lengthen Because of Strikes**
- **Low Coal Supplies Mean Trouble This Winter**
- **Steel Price Changes May Come in 30 Days**

**T**HE opportunity of steel companies to catch up on some of their orders while consumers make last minute progress on reconversion changes has been severely curtailed this week by coal strikes and their effects on steel production. Steel industry coal supplies never were at a healthy level during the past few years, and the shutdown of coal mines in western Pennsylvania because of labor difficulties means not only an immediate curtailment in steel production but recurring declines in the future.

A number of blast furnaces have been forced down in the Pittsburgh, Youngstown and Cleveland districts, thus forcing cutbacks in raw steel production and a subsequent slowing down in some finishing mills. Coal supplies are at such a low point that by-product coke ovens furnishing the fuel for blast furnaces must be cut back to even a greater extent in order to keep as many ovens in operation as possible. When the ovens are once shut down they must be completely repaired before starting up again.

Normally steel companies should be obtaining as large an inventory of coal as possible at this time in order to offset subsequent severe weather conditions. If the latter materializes this winter, many steel companies will again be forced to operate at a lower rate than would otherwise be necessary.

Even though net steel order volume is somewhat lower in recent weeks due to additional cancellations, lower operating rates have tended to extend deliveries much further into the future. There is no longer any doubt that the tightness in many steel products especially flat-rolled items will cause many steel consumers to revise their more optimistic plans for production of civilian products. Whether or not this difficulty in obtaining bars, sheets and strip will be prolonged depends entirely upon the course of present labor difficulties.

As an indication of how far behind deliveries have become, one major steel producer entered October with a larger carryover of steel which had been scheduled but not rolled than at any time in its history. Total steel backlogs in many cases run from six to seven months' production with a large percentage of this in the flat-rolled steel classification. Some producers have even ceased booking orders for sheets, strip, galvanized sheet and strip, and plates because deliveries have become so far extended that any promises given now would be meaningless.

**A**CCORDING to reliable reports steel price adjustments to take care of factors other than any wage increase which may be granted in the steel industry have been practically decided upon by OPA. It is understood that the announcement of price increases in the steel industry is being held up pending a clearer idea of what the industry faces in the way of increased wage costs. The latter, should they come,

are not included in any current steel price increase negotiations.

Barring unforeseen events price increases on many carbon steel products may be announced within the next 30 days or so. On an overall basis the adjustment may average out between \$2 and \$2.25 a ton. Higher increases will be made on items showing the greatest loss or the least return, while lower adjustments or none at all will involve products on which the return is considered to be almost enough or enough. Should advances be made on semi-finished steel, as it is expected, corresponding increases will be made on some flat-rolled products to an extent which will enable small nonintegrated producers to obtain relief. Contemplated changes are far from what the industry had asked for and in the event of increased steel wages, additional price adjustments will be demanded by the steel industry.

**D**EMAND for structural steel material is heavy. Among the leading structural awards made this week are: From 2000 to 3000 tons for a Chevrolet commercial body plant addition at Indianapolis; 1400 tons for a Standard Oil Co. research building at Hammond, Ind.; 1000 tons for four warehouse buildings for Lloyd C. Fry Roofing Co. at various points; 540 tons for a Sherwin-Williams Co. power plant at Chicago; 470 tons for a Lafayette Steel Co. warehouse at Chicago.

Concrete bar sales in September totaled about 94,000 tons with production reaching about two-thirds of that figure. Since July, sales of this item, which is a good index of building activity, have been more than 90,000 tons a month. Fabricators are unable to build up stocks. Where prior to the war about 5 pct of the concrete bar output was for export, about 30 pct is now going abroad. A French inquiry for 32,000 tons of concrete bars required such early delivery that the disposition of this business had not been settled.

War expansion in steel facilities and the introduction of new products has enabled Canada to attain almost complete independence of the United States with regard to steel supply. Before the war the Canadian automotive industry imported practically all sheets used in the manufacture of automobiles there, as well as a large percentage of castings. These export potentialities will be drastically changed upon completion of the new sheet and strip mill unit at the Hamilton Works of the Steel Co. of Canada.

Because of coal strikes the steel ingot rate for the United States this week has declined three points to 76 pct of capacity and if the mine deadlock continues, further reduction is indicated for next week.

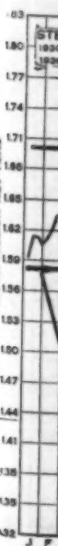
The effects of coal strikes on the steel industry has lessened interest in maintaining scrap supplies, but this condition has failed to produce any significant trend in steel scrap prices.

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• **STRUCTURAL STEEL ORDERS**—August bookings of fabricated structural steel for bridge and building construction, reported to the American Institute of Steel Construction by companies representing 73.8 pct of the total average bookings of the industry during the years 1923-25, totaled 89,359 tons as compared with 73,738 tons reported for the preceding month and 44,740 tons reported for the month of August 1944. The reported shipments for bridge and building construction totaled 53,207 tons compared with 55,205 tons reported for the same month last year. The reported tonnage available for future fabrication at Aug. 31 was 201,100 tons.

• **TOOL STEEL MARKETS**—Automotive, coal and other strikes have hit the tool steel business pretty hard insofar as total volume of orders is concerned. The orders have not dropped off much in number, but the total demand for tool steel and tool steel products has fallen quite seriously. However, manufacturers have been working at the capacity of their manpower for some time. Manpower seems to be the main bottleneck in this industry, as in steel, as far as increased production is concerned. Producers are still working, in many cases, on a 48-hr work week schedule and report that additional manpower would be welcomed.

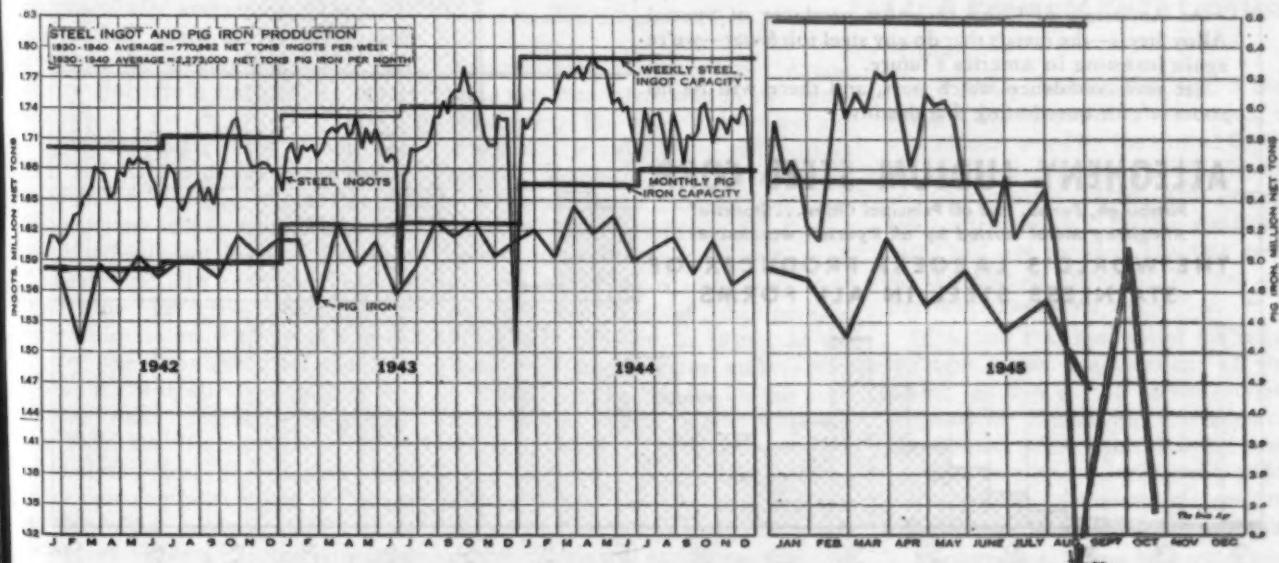
• **IRON ORE SHIPMENTS**—Cumulative shipments of iron ore from upper lake to lower Great Lakes ports reached 61,671,771 the week of Oct. 1, 4,231,413 tons or 6.42 pct less than the 1944 movement at the same date, according to the Lake Superior Iron Ore Assn.'s monthly report. Evidenced by lowered steelmaking operations, sporadic shortages of coal, and the confusion resulting from VJ-Day cancellations, this season's downward trend continued during the September movement, which was down 785,930 tons from the 11,329,029 tons shipped in the same month of 1944. Competent observers still believe that with about six weeks left for heavy loading, this season's total will be in the neighborhood of 80,000,000 tons. Only 176 cargoes of iron ore were delivered to Cleveland docks during September compared with 206 for the same month a year ago.

• **ANDREWS STEEL OUTLOOK**—While no definite word has been given as to when the Andrews Steel Co., Newport, Ky., will reopen, the general presumption in Cincinnati is that it will be some time after November before

this steel producer will resume operations. Immediate closing arose from the fact that the government had leased this plant during the war, and the Andrews Steel officials had operated it for the government, but upon the conclusion of the war, orders were canceled as well as the lease, and in the meantime the company ceased operating the unit. Now there are necessary reports for the government, combined with the required inventories, and this is expected to keep producer out of the market for quite some time. Early rumors indicated that the plant might never reopen, but present reaction of officials of the concern is that it is likely to resume some time after the first of November, with indications that Nov. 15 is a likely date. Another deterring factor in this plant's reopening has been the high price on pig iron and scrap and unless this is cut, some officials think that this shut-down may be longer than is anticipated.

• **CANADA'S STEEL INDEPENDENCE**—Canada has attained almost complete independence of the United States with regard to steel supply as the result of the introduction of a large number of new lines during the war years. To meet the sudden and big demand for steel that developed with the outbreak of the second world war, approximately \$100,000,000 was spent on additions and new equipment by the Canadian steel industry. Its new equipment enables steel makers in Canada to turn out a wide range of products that had not previously been made here and for which the Dominion was dependent upon United States for supply. While a number of new types of steel already have been introduced, others will be added at the beginning of next year as units now under construction go into production.

• **NEW ENGLAND SHIPYARDS**—Shipyards are gradually getting back to a prewar basis in New England. Last launching at the Bethlehem Steel's Quincy yard was a destroyer on Sept. 1. Major part of the current work here is fitting out ships. Unauthorized report is that a modest amount of work for private concerns has been or is about to be booked. Workers are endeavoring to formulate a strike, being dissatisfied with pay for a 40-hr week and the number of employees is being slowly reduced. In September the Portsmouth Navy Yard dropped 3060 from the payroll of which 2505 were let go because of insufficient work, 516 resigned, 38 were lost by retirements and death and six entered the armed forces, being placed on military furloughs.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
Week 2.....	70.0	91.0	74.5	78.5	88.5	99.0	72.0	95.0	95.0	37.0	81.0	67.5	83.0	79.0
Week 9.....	65.0	86.0	67.0	79.5	79.0	99.0	72.0	95.0	93.0	62.0	81.0	67.5	83.0	78.0

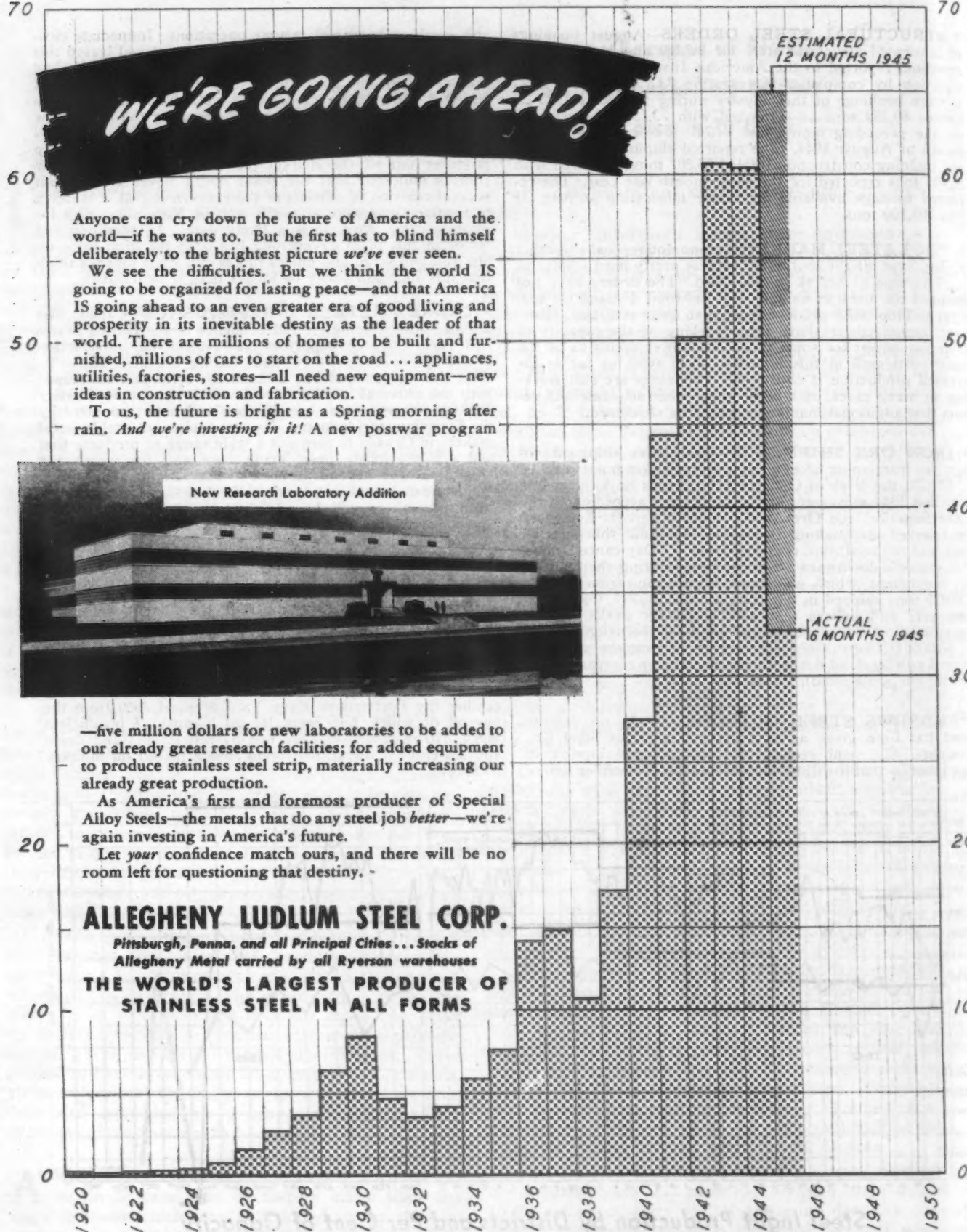
MILLIONS  
OF  
DOLLARS  
70

# STAINLESS STEEL SALES

ALLEGHENY LUDLUM STEEL CORPORATION

MILLIONS  
OF  
DOLLARS

70



The above chart shows the amazing growth in the use of Allegheny Metal, the pioneer stainless steel, since it was first introduced commercially in 1920. The interesting and obvious fact is that the merits, properties and outstanding values of this corrosion and heat-resistant metal have been brought into sharp focus by the war. Even with the tremendous increase in the use of Allegheny Metal depicted by the chart, its actual widespread potentialities in future peacetime applications are vastly greater.

## Canada Seen Close to Self Sufficiency In Steel

... By F. SANDERSON ...

### Toronto

• • • Canada has attained almost complete independence of the United States with regard to steel supply as the result of the introduction of a large number of new lines during the war years.

To meet the sudden and big demand for steel that developed with the outbreak of the second world war approximately \$100,000,000 was spent on additions and new equipment by the Canadian steel industry.

Its new equipment enables steel makers in Canada to turn out a wide range of products that had not previously been made there and for which the Dominion was dependent upon United States for supply. While a number of new types of steel already have been introduced, others will be added at the beginning of next year as units now under construction go into production.

In the years before the war the Canadian automotive industry imported practically all sheets used in the manufacture of automobiles as well as a very large percentage of the castings. This was due to the fact that Canadian mills did not turn out this special line of sheets and alloy castings.

Insofar as alloy steels are concerned Canada now is in a position to turn out practically everything it requires and in fact some of its alloy steel producers are seeking outlets for surplus production in the various export markets.

Upon the completion of the new sheet and strip mill unit at the Hamilton works of the Steel Co. of Canada, this company will be equipped to supply practically all grades and types of sheet steel. In addition it will go into rather extensive production of strip which is an entirely new product for the Canadian steel industry. Before the war all strip used in this country was imported; the greater part from the United States.

Stainless steel is another item which now can be supplied in Canada and for which producers are looking for export markets. In the structural steel field Canadian steel mills are expanding production and are going into the heavier sizes. While Canada still depends largely on American shapes which are fabricated in Canada this condition is expected to change in the

### Canada Puts Duty On Diesel Engines

Ottawa

• • • Canadian government ruled that Diesel engines of a certain type, for tariff purposes, now are declared to be "of a class or kind made in Canada." This new ruling which became effective Sept. 20 means that all Diesel engines with a piston displacement of over 190 cu in. per cylinder, normally operating from 400 to 1200 rpm, must now pay a duty of 25 pct when entering Canada.

Previously, these engines had been considered of a kind or class not made in Canada and therefore entered the country duty free. The ruling does not include engines imported for use in self-propelled machines, such as road making machines, buses, trucks and tractors.

Of special significance is the fact that this movement is one of the first made by the Dept. of National Revenue to give effect to a new wartime industry. This industry is one that for some time has been attempting to establish its claim as being in a position to serve Canadian users with commercial engines. Three plants in Canada are turning out engines of a type referred to, two on the Pacific coast and one in Montreal.

comparatively early future. Armor plate also was introduced in this country during the past five years and production is said to be sufficient to meet all domestic requirements.

While Canadian industry will continue to take certain types of steel from United States producers, it is estimated that imports will drop to 50 pct or even less of the tonnage brought in previous to 1940. At the same time Canadian steel makers plan to make a more extensive bid for business in the export markets of the world.

The expanded production facilities arising out of the war have brought Canadian steel plants to a point where capacity soon will exceed consumption requirements.

At the end of 1939 Canada's capacity for the production of steel ingots and castings was rated at 2,346,000 net tons whereas at the present time capacity totals 3,623,400

net tons. This enlargement not only increased capacity by more than 50 pct but also has been reflected in the output of new lines of steel, especially alloy steels and various rolling mill products that formerly had to be imported. In alloy steels alone production capacity today is approximately eight times what it was at the beginning of 1940.

### Export Permits Dropped

Washington

• • • ODT has announced that commercial freight may now be shipped to ports for export without the necessity of obtaining ODT export permits.

Each shipment must be covered by a bona fide booking with the ocean carrier unless consigned to pre-arranged port storage, and that rail transportation shipping documents must carry the certification by the shipper: "General Permit ODT 16B-3 applies."

General Order ODT 16B remains in force for freight shipped for export by the Army and Navy, and all Government agencies including such organizations as the Red Cross and United Nations Relief & Rehabilitation Administration.

### OPA Exempts Price Control

Washington

• • • OPA announced on Oct. 3 that charges for dismantling or removal of war plants owned by the United States or an allied government will be exempt from price control. This exemption, effective Oct. 8, the statement said, will not increase business costs or the cost of living. The war department requested the action.

OPA said that because of the many different types and locations of war plants, as well as the varied services required in dismantling and removal operations, price control over these services involved administrative difficulties disproportionate to their contribution to the stabilization program.

Furthermore, it was held, price control exemption presented no threat of diversion of materials or manpower from activities essential to an effective transition from war to peace conditions, and would not impair price control over other services.

## Iron Ore Consumption Declines in August

Cleveland

• • • Consumption of Lake Superior iron ore, according to monthly report of the Lake Superior Iron Ore Assn., amounted to 5,658,278 tons in August as compared to 6,532,273 tons in July and 7,341,964 tons in August a year ago.

Cumulative consumption to date totals 52,536,854 gross tons as compared to 59,003,927 tons for the same period of 1944. Of this amount 50,867,692 tons were used by U. S. furnaces compared to the previous year's figure of 57,275,631 and Canadian furnaces consumed 1,669,162 tons this year as compared to 1,728,296 tons to the same date a year ago.

Ore on hand at furnaces and Lake Erie docks on Sept. 1 totaled 34,781,382 tons as compared with 29,485,221 tons on Aug. 1 and 37,243,322 tons on Sept. 1 a year ago.

There were 6 Canadian and 146 U. S. furnaces in blast Sept. 1, with 4 Canadian and 39 U. S. furnaces idle. Corresponding figures a month ago were 158 U. S. furnaces and 7 Canadian furnaces in, with 27 U. S. and 3 Canadian furnaces idle. On Sept. 1 a year ago there were 167 U. S. and 6 Canadian furnaces in blast and 20 U. S. and 4 Canadian furnaces not operating.

## Youngstown Rate Down

Youngstown, Ohio

• • • Youngstown district steel production was scheduled for a drastic reduction for the week beginning Oct. 8, as operations were again curtailed by the Republic Steel Corp. here and completely suspended at the Farrell works of the Carnegie-Illinois Steel Corp., because of the coal shortage.

At Sharpsville, Pa., the Shenango Furnace Co. banked one of its two blast furnaces for lack of fuel. Iron for casting steel ingot molds is made in these units.

Officials of the Youngstown Sheet & Tube Co., also hard-hit by the coal situation, are trying to prevent another reduction, at least for the present.

Operations are unchanged at Carnegie-Illinois Steel Corp.'s Ohio Works, where sufficient amounts of coke and coal are available for this week, but future operations are reported to be uncertain. Sharon Steel Corp. has made no change in opera-

tions, but the Struthers Iron & Steel Co.'s Anna furnace has been banked because of the coal shortage.

## Coal Strikes Slow U. S. Steel Production Rate

Pittsburgh

• • • The coal strike hit operations in U. S. Steel Corp.'s subsidiaries here early this week and by the end of the week threatens to bring at least two plants of Carnegie-Illinois to a complete standstill. Regardless of management-union negotiations this week, the miners will not return to work before Monday of next week, and by that time operations will be slowed down to perhaps the 50 pct mark in the district.

First hit of the U. S. Steel subsidiaries was the Farrell Plant of Carnegie-Illinois Steel Corp. which completely abandoned operations on Sunday when all of its blast furnaces and openhearthers were shut down. Some 1700 to 1800 employees were thrown out of work here. On Monday evening, four of the five blast furnaces at the Ohio Works of Carnegie-Illinois shut down, and within 24 hr the bulk of the openhearth capacity will shut down. It is probable that by the end of the week this plan will likewise cease all operations, both primary and finishing.

### RECONVERSION SPOTLIGHT:

*On the assembly lines at the Firestone Steel Products Co., which have been reconverted to meet consumer needs, civilian truck, bus and farm tire rims roll along.*



Coke production at the Clairton Works, the main source of coke for all U. S. Steel Pittsburgh operations, went down to 50 pct of capacity over the past weekend, and by next weekend will be down to about 12 pct, which is just enough to keep the ovens hot. All other plants of Carnegie-Illinois, including Duquesne, Edgar Thomson and Homestead, have curtailed blast furnace production and of the 111 openhearthers operated by the company in this district, 41 are out of production. Vandergrift Works is the only plant that has thus far avoided any shutdown. By Tuesday morning, in addition to the layoffs at Farrell Works, Carnegie-Illinois had sent 2500 men home from work. About 2000 of these were from the Homestead Works and the remaining 500 from the Duquesne Works.

National Tube Co. has curtailed blast furnace operation at both its National Works at McKeesport, Pa., and its Lorain Works, at Lorain, Ohio. Thus far American Steel & Wire Co. has not had to curtail blast furnace production at the Donora Plant. Likewise, National Steel Co. has not yet curtailed any of its operations, nor has Pittsburgh Steel Co., which estimates about a week's supply on hand.

Jones & Laughlin Steel Corp., which is fighting the test case against the union on the supervisory employee unionization question, dropped their operations about 2 pct this week, but this is not sufficient to be caused by any coal shortage. The fact of the matter is that the coal shortage has not hit J&L as yet because the company was able to procure about 45,000 tons of high grade metallurgical coal through a government surplus sale. However, should the strike last through the early part of next week, it is likely that some curtailment will be made by J&L. Two of its blast furnaces are already off for repairs and another is scheduled to go off shortly for relining, but none have been shut down for lack of fuel.

Practically all of the big coal workings in this area are now closed down, and the only mines operating are small truck mines that are operating under the direction of pit bosses who are not affected by the walkout. Some stripping operations are still at work, but the coal shortage is now very acute. A rationing system has been installed by the Solid Fuels Administration whereby hospitals and institutions of a similar nature are protected by a priority rating.

## Coal Strikes May Threaten Steel Production

### Washington

• • • Continuing coal strikes may make it necessary to ration coal for production of steel within the next few weeks, WPB Chairman J. A. Krug told a news conference Oct. 5.

Although the strikes at the moment involved only a small portion of the total coal output, Mr. Krug pointed out that a considerable percentage of metallurgical coal needed in steel production was affected.

"WPB will probably have to apportion the coal available for steel companies over the steel industry and will have to work out a system for allocating coal between gas utilities because we are the only organization with a system for doing that," Mr. Krug stated.

"We haven't decided what to do with the Steel Div. This, of course, arises from the grave uncertainty as to how much steel can be produced with the coal we will have available," he added.

Action by WPB in rationing coal would probably be tied in with a recent directive of the Solid Fuels Administration which permits diversion of coal produced at any source to priority users such as public utilities and gas manufacturing plants.

During the critical shortage of manufactured gas early this year, WPB invoked a system of priorities which permitted only rated facilities and plants engaged in urgent war programs to receive supplies. These ratings were assigned by the then functioning Production Urgency Committees.

### New England Faces No Early Coal Shortage

#### Boston

• • • New England faces no serious bituminous coal shortage, industrially or domestically, for the next 30 days despite the bituminous strike, according to Borden Covell, bituminous distribution manufacturer for solid fuels. However, coal for making gas is very short, has not been plentiful for many months, and should the strike continue for any considerable time, a decided pinch will be felt.

New England producers of foundry coke say they have been unable to establish any considerable amount of

reserve foundry coke, but insist foundries will not go without fuel no matter how long the strike lasts, although there may be some delays in deliveries. They therefore urge foundries not to allow coke supplies to get too low. On the other hand they do not want foundries to stampede purchases.

### Chicago Steel Plant Production Down

#### Chicago

• • • Eight blast furnaces in the Chicago district are being blown out following halting of shipments from strikebound coal mines, and low coal inventories threaten further shut-downs if the strike continues.

Inland Steel Co. has shut down two furnaces, and steel operations have taken a corresponding drop at Indiana Harbor. Carnegie-Illinois schedule this week calls for blowing out progressively three stacks at South Works and three at Gary, dropping their weekly iron production rate 15,000 tons.

The situation has been brought to a head by diversion of final coal shipments from the mines to railroads

**MOTOR CONTAINER:** Welded at Warren City Mfg. Co., Warren, Ohio, these air-tight steel containers are used for shipment of aircraft engines to the Pacific. Shock-absorbers in the cans permit use of engines on arrival without overhauling.



and utilities. Low inventories previously required by WPB have prevented accumulation of normal coal stocks at the mills.

Wisconsin Steel Co., which blew out one furnace before VJ-Day in order to allow improvement of coal inventories, has delayed returning to production of this furnace. The company's mines, manned by AFL miners, have not been affected. Interlake Iron Co. likewise is delaying blowing in a furnace which has been down for repairs. Operations at Youngstown Sheet and Tube and Republic Steel here have not yet been affected.

### J&L Case Sets Pattern For the Coal Industry

#### Pittsburgh

• • • With more than 500 of the coal mines that supply western Pennsylvania, West Virginia and eastern Ohio out on strike because of the drive for the unionization of foremen and supervisory employees through District 50's United Clerical, Technical, and Supervisory Employees Union, Jones and Laughlin Steel Corp. turns out to be the "guinea pig" in the test case of the drive. Hearings were held last week and began again this week before a representative of the National Labor Relations Board to determine whether or not it is permissible for foremen and supervisory employees to be represented by this branch of the United Mine Workers.

Since this is the first case since Union Collieries that involved the coal mining industry, the decision, which will be made by the NLRB in Washington, will set the pattern for the entire coal industry. The Union Collieries decision of several years ago, which permitted an independent union to organize the foremen was offset by a later decision which was a reversal of the original conclusions.

However, this is the first case in which the union involved also represents the rank and file workers in an industry, and the decision rendered by the NLRB will go into effect at practically every coal mine in the country.

Proceedings at the hearings to date have been mainly the questioning of J & L coal officials, and it is too early to determine any trends that the hearing is taking.

## WPB Goes Out; Truman Creates Civilian Production Administration

### Washington

• • • The War Production Board goes out of existence Nov. 3, after nearly four years of directing America's industrial might against the Axis.

President Truman has created by Executive Order a new Civilian Production Administration which will take over the job of administering some 40 remaining industrial controls to expand production of materials in short supply, limit use of scarce materials, restrict inventories to avoid speculation, hoarding and unbalanced distribution, grant bottleneck priorities assistance, facilitate foreign relief and other essential export programs and allocate materials used in production of low cost items essential to the stabilization program. Priorities assistance to break reconversion

bottlenecks will still be given under the simplified plan recently adopted by WPB (THE IRON AGE, Sept. 13, p. 82).

The new CPA, which will be a much more compact organization, is responsible to the Director of War Mobilization and Reconversion.

The WPB staff, which at the peak, numbered around 23,000 employees, will have been re-

duced to approximately 3000 when CPA takes over.

John D. Small, formerly WPB Chief of Staff, has been appointed CPA director at a salary of \$12,000 compared with \$15,000 drawn by WPB Chairman Krug.

Mr. Krug's resignation marks the end of a long period of government service during which time he served as manager of the Tennessee Valley Authority. He is reported to have accepted a position with a New York investment banking house.

Commenting on the change, Mr. Small emphasized that any outstanding WPB regulations, directives, orders or delegations of authority will remain in full force and effect under CPA until specifically re-

voked or amended. They will be lifted when no longer needed for orderly reconversion, he added.

The CPA will consist of five bureaus, the functioning of which were outlined as follows:

Industrial Reconversion Operations will deal with problems affecting particular industries which produce or consume scarce raw materials and products such as tin, lead, rubber, for-

est products and other minerals, some construction materials, a few textile items, chemicals, various hard goods and equipment items. The remaining functions of the Steel Div. will come under this bureau which will be headed by Walter C. Skuce, formerly WPB Deputy Vice-Chairman for Operations.

Reconversion Priorities under Lincoln Gordon, formerly WPB Program Vice-Chairman, will be responsible for general modification of priorities and allocations controls, internal clearance of agency actions, appeals, inventory problems, compliance and relationships with other agencies.

Field Operations will be concerned with field activities, including compliance investigations. WPB Vice-Chairman for Field Operations Clarence Woodruff will head this bureau.

International Supply, headed by Robert Turner, Chief of WPB Foreign Div., will be concerned chiefly with imports, exports and international allocations.

Demobilization Bureau will be charged with the responsibility of winding up the administrative affairs of the organization.

Mr. Small, who graduated from the Naval Academy in 1915, joined WPB in September 1944, before which time he served as Deputy Director of the Army-Navy Munitions Board. From 1932 to 1941 he was manager of the Publicker, Inc., of Philadelphia, and was executive vice-president of the Dry Ice Corp. of America from 1926 to 1932. He served with the U. S. Navy from 1915 to 1926.



J. A. Krug



J. D. Small

## Procedure Announced By OPA to Determine Reconversion Prices

### Washington

• • • Procedures for determining reconversion price ceilings for machines and machinery, the production of which was either eliminated altogether or considerably reduced during the war, were announced by OPA on Oct. 4.

The industry-wide price increase factors previously announced (IRON AGE, Aug. 30, page 88) will apply to specialized types of machinery that have been in large part or wholly out of production during the war years.

Percentage increase factors will be issued individually to machinery producers for use on an industry wide

basis, OPA pointed out, only under the following conditions:

Where 1944 production of the item was approximately one-half or less the production in the last, representative prewar period.

Where the reduction during the war in dollar volume of sales of the product involved resulted from (1) government restrictions on the manufacture of products or on the use of materials, facilities or manpower, (2) the use of facilities in production of war goods or (3) other direct needs of the war effort.

Where because of changes in government restrictions or of needs of the war program manufacturers of the product generally are able to begin or increase production substantially.

The new maximum prices, OPA explained, will represent costs experienced during the last period of normal production adjusted for subsequent lawful changes in materials prices and in basic wage rates of factory workers, plus the industry's average peacetime profit margin over cost. Changes in materials prices, it was said, may be measured by a cost increase factor determined by OPA, in those cases where such action may be necessary to eliminate artificial or temporary influences. Where it is decided to apply such factors to each firm in an industry, the profit element in each increase factor will be the firm's own base period profit margin or one-half of the industry's average peacetime margin, whichever is higher.

## Bayer Aluminum Scrap Recovery Depends on Cost and Freight Factors

East St. Louis, Ill.

• • • The salvage of aluminum from wrecked aircraft scrap by the caustic soda reduction method has been reported successful after an engineering and cost analysis by C. S. Fox and W. H. Cundiff after a test run on 500,000 lb of airplane wreckage. This operation was performed by the Aluminum Ore Co., here, a subsidiary of the Aluminum Co. of America, in conjunction with the Army Air Forces.

The experiment was reported as being successful, but the engineers' cost and value of product data are considered the basis of further questions as to whether the process is commercially economical. The financial data presented are as follows:

Total money expended in experiment .....	\$15,156.58
Estimated non-recurring items .....	4,296.83
Net money expended .....	\$10,859.75
Value of equivalent raw material at current prices prepared for Bayer process at 1.405c. per lb $Al_2O_3$ * .....	8,780.00
Value of magnesium in residue —8c. per lb .....	400.00
Value of remaining residue ..	1,355.00
Total value of recovered materials .....	\$10,535.00
Net money expended .....	10,859.75
Value of recovered materials ..	10,535.00
Loss exclusive of non-recurring items .....	\$324.75

\*East St. Louis value only. This will vary with plant involved, type and price of bauxite used, price of other raw materials, etc.

The value set for the test run residue is based upon a highest bid price of \$13.55 per ton, exclusive of 5,000 pounds of magnesium castings. The value of the magnesium was taken as 8 cents per pound for mixed magnesium scrap.

The test was conducted using a representative lot of 500,000 lb of wrecked airplane scrap from several fields, at a cost of 1½c per lb delivered at the plant.

The scrap is dropped into a tank containing dilute caustic soda liquor. The steel, lead, copper, magnesium, and non-metallic materials used in the construction of aircraft are little affected, but the aluminum is dissolved and becomes a sodium aluminate solution. This is pumped into the Bayer alumina plant where it merges with other alumina in process, and is treated by the standard Bayer

process to ultimately become primary aluminum.

Assuming that \$30 per net ton could be paid for crashed aircraft scrap, f.o.b. East St. Louis, the following table of break even price has been drawn up to show the influence of freight rates on the amount which could be paid for scrap at the point of collection. Values, including freight rates, are shown for the points from which aircraft scrap have been received. All values shown are based on a 40,000-lb minimum load rate.

In addition to the aluminum produced by the salvaging operation, considerable residue of other metals also is generated. The report of the technicians comments as follows:

Origin	Rate to E. St. Louis, Ill.	20,000 Lb Carload	30,000 Lb Carload	40,000 Lb Carload
George Field, Lawrenceville, Ill...	18c./cwt	\$22.80	\$25.20	\$26.40
Chanute Field, Rantoul, Ill.....	21c.	21.60	24.40	26.20
Truax Field, Madison, Wis.....	25c.	20.00	23.33	25.00
Lockbourne Army Air Base, Lockbourne, Ohio .....	27c.	19.20	22.80	24.60
Patterson Field, Fairfield, Ohio..	29c.	18.40	22.27	24.20

After aircraft scrap has been treated with caustic soda solution, the non-aluminum parts form a heterogeneous mass at the bottom of the tank. All this material is thoroughly mixed and is coated with a black sludge probably made up of the insoluble ingredients of the aluminum alloys, copper, magnesium, etc., plus organic material from the paint, insulation and similar items in the planes. The alloying metals thrown out of the aluminum alloy by its reaction with caustic soda are so finely divided that they are mostly carried out of the tank with the liquor and are removed with the red mud. Considerable water, caustic solution and some aluminum hydrate are also present.

The analysis of the sludge present at the bottom of the tank was as follows:

LOI .....	38.30
SiO <sub>2</sub> .....	4.60
Fe <sub>2</sub> O <sub>3</sub> .....	3.07
TiO <sub>2</sub> .....	0.23
Al <sub>2</sub> O <sub>3</sub> .....	46.40
CaO .....	2.13
MgO .....	3.40
Cu .....	3.75
Na <sub>2</sub> O .....	0.06
MnO <sub>2</sub> .....	0.50
Zn .....	Trace

After washing, the magnesium and stainless steel fractions of the residue are easy to distinguish. Chromium

plated steel parts are also readily distinguishable. After weathering a few days the ordinary steel becomes rusty. Copper and brass are slightly attacked by the caustic.

The whole mass of material is tangled together by cloth, control cables, electric wire, rubber etc. A difficult job of segregation remains to the purchaser of this scrap, although some of the ingredients such as stainless steel, magnesium, copper, lead, and steel armor plate represent high recovery values. In many cases even small parts contain three or more different metals.

It is believed that the large magnesium castings such as wheels, supercharger diffusers, and large housings should be segregated and sold separately. This should bring a better return than leaving them buried

with the rest of the residue in spite of the additional cost of segregation.

When the reaction tank is operated for intervals of several weeks without removal of the residue the amount of aluminum left undissolved is small. Even large forgings will completely dissolve after sufficient contact with the caustic soda solution.

The variations in the alumina content of the scrap leave doubt as to whether the 500,000 lb processed really was a representative lot. This variation has a direct bearing on the value of the aluminum scrap to the extent that it is estimated an increase of 1 pct in the aluminum content of the scrap raises the value of the scrap by 39.4c per ton.

## New Process Promises Cheap Barium Supply

Washington

• • • Selling in small lots at the nominal price of \$15 per lb, barium—a mineral plentiful in nature but expensive to prepare in metallic form—probably could be produced at a cost of less than 45c. a lb. by a large-scale operation using processes reviewed in a new Bureau of Mines publication, Information Circular 7327, "Processes for Making Barium and Its Alloys."

## Kaiser Reasserts His Plans for Peacetime Steel and Motor Cars

Cleveland

• • • Henry J. Kaiser, again asserted, recently at a press conference here:

That he is anxious to have the Geneva Steel Plant, which he considers located in an area where automobile building could be a great possibility, primarily through attracting, or moving in, fabricating plants;

That he is planning additional facilities at Fontana, including a sheet mill, for peacetime operations, and emphasized that at the moment, the first problem at Fontana was to bring the capital structure within range of other steel plants. Under such conditions, he pointed out, Fontana with its ingredients for low cost production (conveniently located supplies of iron ore and scrap) can compete. Such an expansion, Mr. Kaiser admitted would dovetail very well with Kaiser-Frazer Corp. plans for automobile production on the West Coast later on;

That he hoped eventually to take the government out of Fontana and that within three or four months he hopes there will be no government money in any of "our plants;"

That he is not frightened by the wave of strikes sweeping the country—"We're taking a holiday, after a while we will settle down and get back to work . . . The competitive force is the greatest force in America . . . Don't sell America short" he admonished.

With Mr. Kaiser, on a visit to Cleveland industrialists and financiers, principally Cyrus S. Eaton, whose Otis & Co. was one of three to underwrite the Kaiser-Frazer Corp., was his partner, Joseph W. Frazer, president of Graham-Paige Motor Co., ex-General Motors and Chrysler Corp. executive.

According to Mr. Frazer, the new combine will officially take over Willow Run Oct. 15, and will move in by the end of the month. By March, they hope to be building automobiles at the rate of 350 a day. The tractor program will be moved into the plant in January, and, Mr. Frazer announced, at the Warren City Mfg. Co. plant which according to reports Graham-Paige is planning to buy, Roto-Tillers will be in production by December.

Continental Motors Corp., with

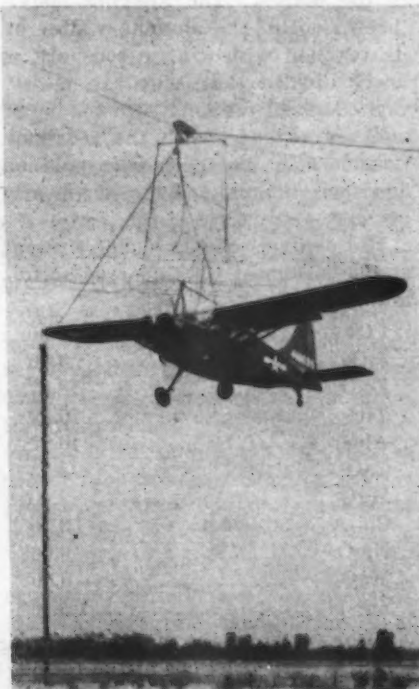
plants in Detroit and Muskegon, Mich., will make at least some of the motors for the Frazer car.

Bodies for the new cars will be built at Willow Run. "We'll be able to better anybody's prices," predicted Mr. Frazer, whose own will be announced, "probably after we've shipped a thousand cars."

Rumors that Jack & Heintz were going to build the motors for the new cars were denied by Mr. Frazer, who admitted that he and Mr. Kaiser had been looking at an "experimental" motor made by Jahco and that it looked like "a good motor" but that he did not know its capabilities and it was not going to be used in the new cars.

However, it was reported here that Jack & Heintz are readying a plant for production of the Skinner motor, which only they are licensed to make, for the Kaiser Car. The Skinner motor, which was used during the war to run generators in the bigger bombers, develops 24 hp, according to reports. In principle, it is somewhat similar to the Knight Sleeve-Valve engine, having aluminum cylinders and steel liners.

**LANDS IN MID-AIR:** An Army observation plane equipped with an overhead hook, comes in slowly and engages a loop suspended on a cable, during a test of the Brodie System at Wright Field, Dayton. The loop and plane then slide along the cable until stopped by a friction brake.



## Multi-Billion Dollar Control Guide Revoked By WPB Chairman Krug

Washington

• • • Directive 2, which guided the government's multi-billion dollar spending for war was revoked on Oct. 5 by WPB Chairman J. A. Krug. In revoking the Directive, Mr. Krug said that the war procurement agencies were following purchase policies which both fulfilled continuing military requirements and assisted orderly conversion from war to peace.

In a letter to heads of the war procurement agencies announcing the revocation, the WPB Chairman requested the continued observance of the spirit and the letter of the Smaller War Plants Act which required that contracts be placed so as to utilize most effectively the nation's small factories. This request was coupled with a declaration that a new directive would be issued if conditions should require it.

Directive 2 set forth government buying policy in the war period. It provided for direct negotiation to speed the placing of contracts and set forth other considerations such as the payment of higher prices if necessary to achieve best utilization of facilities, the placing of contracts in areas where labor was most plentiful and where transportation would be least hard hit, and other factors. The revocation does not end the assistance to small business and negotiated buying, Mr. Krug pointed out.

The action was recommended by the Procurement Policy Board of the War Production Board, composed of representatives of the Secretaries of War, Navy and Treasury, the Administrator of the Office of Price Administration, the Chairmen of the Maritime Commission and the Smaller War Plants Corp. and the Director, Procurement Policy Division WPB.

## Back Wages to Be Paid

Youngstown, Ohio

• • • Officials of the CIO-United Steelworkers of America report that back wages totaling \$800,000 will be paid by the Truscon Steel Co., a Republic Steel Corp. subsidiary, to 3500 present and former employees under terms of a company-union contract signed recently. Payment was for shift differentials from Dec. 25, 1943 to Sept. 10, 1945.

## Bell Aircraft Plans Organization Changes

Buffalo

• • • The Bell Aircraft Corp. has announced a streamlining of its administrative and operating organizations for peacetime commercial and military work. Features of the readjustment include:

Consolidation into one operating unit of the Niagara Frontier Division, which previously manufactured all of Bell's fighter planes, and the corporate staff, which had administrative supervision of all divisions in the Buffalo area and elsewhere.

Creation of an executive committee with President Lawrence D. Bell as chairman. Other members are Ray P. Whitman, who has been named vice-president in charge of sales; Charles L. Beard, vice-president in charge of finance, and D. Roy Shoults, named vice-president in charge of engineering.

Creation of a manufacturing department, with Lester Benson as manager.

Appointment of David G. Forman as manager of helicopter operations.

Designation of Leston P. Faneuf, secretary of the company, as administrative assistant to the president.

Other departments which will report to Mr. Bell are personnel planning and coordination, public relations, quality and legal.

## Metal Show Slated For Cleveland Feb. 4, 1946

Cleveland

• • • Plans have been completed for the first postwar industrial show with the announcement recently of the 27th National Metal Exposition to be held in Cleveland's Public Auditorium from Monday, Feb. 4 through Friday, Feb. 8, 1946. Originally scheduled for October of this year, the event was moved back to February to avoid any interference with heavy wartime transportation demands, according to W. H. Eisenman, managing director of the exposition and national secretary of the American Society for Metals, sponsor of the event.

"This industrial show will be the largest ever held in America," Mr. Eisenman said. "Because of the widespread advance interest in the metal exposition, the floor plans which have been mailed to previous exhibitors

showed a greater area of exhibit space than any event of this type in the history of U. S. industrial shows."

"For the first time in four years," he added, "the metal show, as it is generally known in industry, will be a forthright effort on the part of exhibitors to sell their products."

Mr. Eisenman pointed out that the exposition would again be held in conjunction with the National Metal Congress. Cooperating with the American Society for Metals in presenting the metal congress will be the American Welding Society, the Iron and Steel and Institute of Metals divisions of the American Institute of Mining and Metallurgical Engineers, and the American Industrial Radium and X-Ray Society. Many trade associations and industry groups will also meet in Cleveland during the week of this event.

## Appliance Ceiling Raised

Chicago

• • • Price ceilings allowing washer and ironer manufacturers a 7.7 pct increase over 1942 prices will be appealed by producers, the Washer & Ironer Manufacturers Assn. asserts. An interim increase of at least 15 pct is necessary and 20 pct or more is needed for manufacturers to break even, it is claimed.

The small increase allowed must be absorbed by wholesalers and retailers. The OPA was assailed as having a closed mind to evidence supporting the necessity of wider increases.

## New Weapons Point To Stratospheric Warfare

Pittsburgh

• • • Predictions of the drastic consequences of another war because of newly developed weapons were made by Gen. G. C. Marshall, Chief of Staff of the U. S. Army, in his biennial report to the Secretary of War.

Some of the new items listed were aircraft that could bomb any part of the world and return to a friendly base, and a 100,000 ton bomb that could be carried by this plane. However, the latter has been made obsolete by the atomic bomb and the atomic bomb has practically made the new aircraft unnecessary for bombing.

One item that confounds the imagination is Gen. Marshall's reference to rocket direction devices. He states: "We can direct rockets to targets by electronic devices and new instruments which guide them accurately to sources of light, heat, and magnetism. Drawn by its own fuses, such new rockets will streak unerringly to the heart of big factories, attracted by the heat of the furnaces. They are so sensitive that in the space of a large room, they aim themselves toward a man who enters, in reaction to the heat of his body."

The only defense against this kind of warfare, Gen. Marshall states, is the ability to attack. While a navy can protect the shores against attack from an amphibious enemy, this country must be prepared against stratospheric envelopment with new techniques and new weapons.

**THREE WHEELER:** Shown to the movie stars of Hollywood is this alleged postwar automobile. The tabloid-type caption furnished says the machine will do 100 mph and will make 40 miles to the gallon of fuel. It is said to be ready for production in four months.



## Batt Discloses Great Britain Will Send Us 5000 Tons Pig Tin From Stock

### Washington

• • • Prolongation of the Bolivian tin industry's life is of more interest to the United States than the destruction of any cartel, S. D. Strauss, deputy director of the RFC Metals Reserve Office told the Senate War Investigating (Mead) Committee recently.

Testifying at the first of a series of hearings called to determine the extent to which reconversion has been retarded by the scarcity of metals and other raw materials, Mr. Strauss said that the Texas City, Texas, tin smelter should continue as a postwar enterprise. The most desirable arrangement, he said, would be to have it operate under private enterprise without government subsidies but if subsidies should prove necessary, we should not hesitate to grant them.

The Texas City smelter which was constructed in April 1942, at a cost of \$6 million, has a capacity of 42,000 tons a year and can treat any type of ore. It has been smelting 40 pct tin content ore but if higher grade ores were available, production costs would be considerably reduced. Additional factors cited in favor of continuing operation are that acid and

gas costs in that vicinity are low, transportation costs are quite reasonable and production can be adjusted to suit individual customers.

Another suggestion which would help assure adequate supplies of tin is for the government to purchase ores and turn them over to the smelter for processing on a toll basis.

The rather muddled Pacific tin situation was discussed by William L. Batt, WPB vice chairman for international supply, who cautioned against putting much faith in rumors concerning the supply situation in the next few months. Available information, he said, although very incomplete, indicates considerable damage among the Malaya tin producing interests but it is perhaps even greater insofar as the Dutch producers are concerned. It has been estimated that of the 110 dredges which were in the Dutch area before the Japanese invasion, less than a dozen can now be utilized.

Pointing out that tin production from low grade domestic ores amounted to less than ten tons a year, Mr. Batt emphasized that continued cooperation of the British and Dutch with the United States was assured

and that we would continue to get our fair share of the world tin supply. He estimated that domestic tin requirements for 1945 would total 94,000 tons, compared with 89,000 tons for 1944. Unrestricted use of tin would consume 120,000 tons, it was pointed out. Mr. Batt disclosed that the British had recently agreed to furnish the United States with 5000 tons of pig tin out of an estimated stockpile of 25,000 tons.

Extension of the President's powers under the Second War Powers Act will be necessary for reconversion, Mr. Batt said, repeating his earlier statement that certain powers will be needed to take care of the situation created by shortages in supplies of certain materials. It was his opinion that they should be broad enough to permit inventory controls and to make possible an orderly distribution of scarce materials to consumers on a priority or allocations basis. This, he said, would prevent unnecessary dissipation of scarce materials and satisfy the more essential users' needs.

Senator Homer Ferguson, Republican of Michigan, said that the idea of imposing government controls on scarce commodities was a new peacetime philosophy. This statement brought an emphatic reply by Mr. Batt that all unnecessary controls should be lifted immediately. He added that the maximum interest of our economy would not be best served by allowing the law of supply and demand to operate in the immediate postwar period. Determination of which users shall be eligible to receive materials was a matter for Congress to decide in enactment of stockpiling legislation which has already been introduced, Mr. Batt said.

Imports of tin ore are expected to remain at 1944 levels although some decrease may come about as a result of the decision by the Belgian interest to divert shipments from the Belgian Congo to their smelters in order to satisfy reconstruction needs.

The activities of the State Department in the tin situation were described as being not of a short term procurement nature but more of long range planning and negotiation of commodity agreements. The department does not propose to enter a cartel or international commodity agreement unless incidental problems cannot otherwise be solved, said Donald D. Kennedy, chief of the department's Commodity Division.

## Bolt, Nut and Screw Makers Account For Large Steel Tonnage

### Washington

• • • Approximately 9 million tons of carbon and alloy steel were consumed annually by manufacturers of bolts, nuts, screws, pressed metal parts, screw machine parts, springs and other components, the WPB disclosed recently in reviewing the contribution to the war effort by that portion of the metal working industry.

Production of these components which totaled \$3 billion annually also required 3.3 billion lb of copper and copper base alloy together with 110 million lb of aluminum each year, the WPB said.

Outlining the variety of uses to which these products were put during the war, WPB also stated that 6.5 million tons of steel were used annually in pressed metal parts, such as stampings, 1.5 million tons for bolts, nuts, screws, rivets and fasteners and 677,000 tons for screw machine products and springs.

*The average annual controlled materials, 1943-44, consumption was:*

	Net Tons Carbon and Alloy Steel	Lb—Copper and Copper Base Alloy	Lb—Aluminum
Bolts, nuts, screws, etc. ....	1,500,000	65,000,000	10,000,000
Pressed metal parts .....	6,500,000	2,500,000,000	.....
Screw machine products .....	620,000	800,000,000	100,000,000
Precision mechanical springs .....	57,000	2,000,000	.....

*Annual average number of companies and employees and value of shipments for the years 1942-45:*

	No. of Companies	No. of Employees	Annual Shipments
Bolts, nuts, screws, etc. ....	500	50,000	\$500,000,000
Pressed metal parts .....	2,800	150,000	1,500,000,000
Screw machine products .....	1,200	85,000	800,000,000
Precision mechanical springs .....	120	10,000	90,000,000
Powder metallurgy .....	15	4,000	25,000,000
<b>Totals .....</b>	<b>4,635</b>	<b>299,000</b>	<b>\$2,915,000,000</b>

## Salvage Div. Indicates 6,000,000 Gross Tons of Scrap Uncovered Yearly

### Washington

• • • While declaring that it is impossible to say how much was due directly to its activities, the WPB in a summary of the work of its Salvage Div. said that during the Division's lifetime, Feb. 1, 1942 to Sept. 30, 1945, an estimated 6,000,000 gross tons annually of scrap material were collected which otherwise would not have been obtained. This marginal flow, it was pointed out, kept up the mills' wartime inventories and was an essential contribution to annual average scrap requirements of 50,000,000 tons.

The Division, now dissolved along with the Conservation Div., inaugurated its last scrap drive in February 1945, when because of below-ceiling prices for most grades of scrap and relaxing of government salvaging support inventories declined by approximately 1,200,000 tons. At that time the steel industry announced its intention of resuming payment of ceiling prices and asked the Salvage Div. to inaugurate another collection campaign, confining its promotion to heavy melting grades. The industry in August 1944 had ceased to pay ceiling prices for most grades and simultaneously the Salvage Div. discontinued its special efforts to generate old material, which were spearheaded by nationwide publicity.

With the renewed Salvage Campaign, according to WPB, the flow of purchased scrap rose from an average of 1,700,000 tons a month to an average of more than 2,100,000 tons.

After pointing out that at the end of February 1942, scrap inventories had declined to 3,085,000 tons, only 3-weeks' supply, the statement explained that war production had reduced the normal volume of scrap generated by industrial processes. Also, WPB said, the exportation of ingots and semi-finished steel, tanks and ships to the Allies and American Armed Forces meant practically no recovery of scrap from these items.

When it became apparent that an arrangement with the steel industry for the solicitation of auto wreckers by the scrap dealers was not proving effective, WPB said, a program requiring auto "graveyards" to move their inventories every 60 days was instituted. Between Feb. 1, 1942 and Feb. 1, 1943 the number of cars junked in auto graveyards, the report stated, was reduced from an estimated

1,500,000 to 400,000 cars. A total of 3,741,719 tons of scrap iron and steel were moved from wreckers' yards during that period, while in 1943 the total recovery from these yards was 1,464,789 tons. From March 1942 to the end of the Division's work, 3,172,931 tons of scrap were moved to consuming mills through 18,072 special

## Income to Chicagoans Reached \$7.6 Billion

### Chicago

• • • Income payments to individuals, including wages, salaries, dividends, interest, rent and relief payments in the Chicago industrial area rose from an annual rate of \$3.7 billion to \$7.6 billion between 1939 and VJ-Day, a joint study of the Federal Reserve Bank of Chicago, the Chicago Assn. of Commerce and the Chicago Committee of the CED, discloses.

projects conducted by the Salvage Div.

A fresh source of iron and steel scrap was obtained during the war by the detinning of used tin cans, which never previously had afforded a source of scrap beyond the experimental stage. The detinning of cans assumed large proportions through the Salvage Div.'s efforts, and as a byproduct produced about 60,000 tons of iron and steel scrap in 1942, and approximately 225,000 tons in 1943 and 190,000 tons in 1944.

The increase in income was offset by higher taxes and increases in cost of living.

Payrolls in the iron and steel industry here rose from \$212 million in 1939 to \$490 million at the end of the Jap war. Nonferrous metals payrolls rose from \$33 million to \$86 million in the same period. Although iron and steel payrolls were the largest of any industry, transportation equipment payrolls rose from \$29 million to \$312 million at VJ-Day, and electrical machinery rose from \$73 million to \$281 million.

## Stainless Steel Basing Points

### Pittsburgh

• • • A recapitulation of the newly established stainless steel basing points is shown here. This is a summary of the basing points announced by the various producers up to and including Oct. 1, 1945.

INGOTS, BLOOMS	SLABS	FORGING BILLETS	HOT-ROLLED BARS*
Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh
Chicago	Chicago	Chicago	Chicago
Fort Wayne, Ind.	Canton	Fort Wayne, Ind.	Fort Wayne, Ind.
Canton, Ohio	Baltimore	Canton	Canton
Baltimore	Philadelphia	Baltimore	Dunkirk, N. Y.
Reading, Pa.	Reading, Pa.	Philadelphia	Watervliet, N. Y.
Philadelphia	Reading, Pa.	Reading, Pa.	Syracuse, N. Y.
		Dunkirk, N. Y.	Reading, Pa.
		Watervliet, N. Y.	Baltimore
		Syracuse, N. Y.	Newark, N. J.
		Newark, N. J.	Philadelphia
DRAWN WIRE**	SHEETS	FLATES	HOT-ROLLED STRIP
Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh
Cleveland	Chicago	Canton	Chicago
Dunkirk, N. Y.	Canton	Middletown, Ohio	Youngstown
Syracuse, N. Y.	Baltimore	††Baltimore	Canton
Baltimore	Middletown, Ohio		‡Reading, Pa.
Reading, Pa.			
Newark, N. J.			
Philadelphia			
Canton			
COLD-ROLLED STRIP	COLD-ROLLED FLAT WIRE	STRUCTURAL SHAPES	SEAMLESS TUBES
Pittsburgh	Cleveland	‡Pittsburgh	Pittsburgh
Youngstown	Baltimore	Chicago	Chicago
Canton	Reading, Pa.		Canton
Cleveland	Dunkirk, N. Y.		
‡Reading, Pa.	Canton		
‡Newark, N. J.			

\*—Same bases apply on Cold-finished Bars with the addition of Cleveland.

\*\*—0.5-in. and smaller.

†—Up to 48 in. wide, cold rolled only.

††—Maximum sizes, 72 x 156 in., up to 3/4 in. thick.

‡—Maximum width, 6 in.

‡—Maximum width, 8 in.

‡—Maximum width, 3 in.

‡—Equal leg angles up to 3 x 3 in. included.

## NSMPA Members Unable To Buy Surplus Screw Machines in Quantity

Cleveland

• • • National Screw Machine Products Assn. members have been trying to buy surplus screw machines, but like many other prospective purchasers, their success in this endeavor has been limited. Apparently the Services still are not rapidly listing machines as surplus and many of them have been left in operators' plants, giving the operators another 30 to 60 days to decide whether they want to keep the machines.

Although potentially sufficient surplus machines will be available for everyone, it appears now that actually there is a limited supply of some types. To make matters worse, NSMPA members object to application of the Clayton Formula because when the original price is taken, less a 20 pct machine tool builders' renegotiation discount returned to the government, plus rental received in many cases from the operators, the Clayton Formula frequently returns to the government more than the machine cost originally.

Orrin B. Werntz, NSMPA executive secretary, cites the following transaction as an example:

New machine cost.....	\$10,000
Three-year rental receipts....	3,750
Clayton Formula sale price...	4,520
Renegotiation refund from machine mfrs. ....	2,000
	<hr/>
	\$10,270
Government profit on surplus	\$270

According to Mr. Werntz, many machines examined show that they were tooled for single purpose use, lacking general equipment, such as threading spindles and other functional mechanism necessary to make an "all purpose" standard tool. In the interim, because machines are coming on the market slowly, there are bidders so anxious to get them that they are giving the Reconstruction Finance Corp. the false impression that Clayton Formula prices are too low.

"RFC is overlooking the statistics," said Mr. Werntz, "statistics showing the potential need for screw machines and the fact that screw machine builders have backlogs ranging from four months to more than one year, indicating plenty of buyers want something new and are, accordingly,

turning down any thought of surplus equipment."

All this results in a dilemma. For the past 18 yr screw machine products manufacturers have been optimistic, and their numerical percentage of machinery placed in plants for normal growth of the industry exceeded a similar percentage increase in sales from year to year. Now, Mr. Werntz points out, with some funds to invest, many companies still want to expand, or at least replace old equipment. If they wait for the price to break, many of the best machines will be gone when the price goes down; if they buy at once, they may easily be paying more than would be warranted because of sales volume or lower prices for machines almost as good. Also, if they wait and don't find what they want and absolutely need in a new machine, screw machine manufacturers' backlogs will necessitate a still longer wait.

In searching for a possible solution to this situation, it has been suggested that pending settlement of strikes, reconversion and a determination of the volume of customers' purchases, it might be advisable for NSMPA members to enter into a rental contract with RFC for equipment now in their plants, or to enlist the services of the Smaller War Plants Corp., which at the moment, is still anxious to help the small manufacturer.

Making the question mark larger, results of a survey of 700 companies made by NSMPA as to how many machines might be purchased by the

industry if the Clayton Formula were 25 pct lower, seem to indicate that a maximum of 3500, of all types, should satisfy the demand. But estimates made at the time of the surplus hearings in Washington last April indicated there should be at least 13,000 of reasonable size range and otherwise usable surplus machines.

## Heavy Cancellations Put Crimp in Rosy Machine Tool Outlook

Cleveland

• • • Machine tool cancellations, which during the month of August almost wiped out new business, have put a crimp in the early and optimistic indications that machine tool builders were in for easy sledding. Along with the normal run of cancellations, some Russian business—perhaps orders that have been cancelled before and reinstated—was cancelled and dealers are reporting that September is no better. Strikes, apparently, or the anticipation of them, have had an effect on orders which are just dribbling in.

On the optimistic side of the ledger, France and Belgium are beginning to buy, but for some reason French orders are not coming through and it is not unlikely that they are bogged down with red tape, even though officially they have been released. Russia is said to be ready to buy again, but there has been little indication of that intention here.

Surplus machines are beginning to come out in quantity and a sizeable sale at the General Rubber & Fireproofing on Oct. 14 is on the docket. Every machine tool, whether standard, general purpose, or otherwise, is marked new and will be sold on open bid subject to approval by the contracting officer. This, along with the dealer's side of the picture, suggests that September is expected to have been a lean month. When long deliveries are quoted on new machines, buyers automatically turn to the surplus; short deliveries mean a turn toward the new and if the present situation continues, the delivery situation will ease considerably, on new machines.

Competent observers feel, however, that shipments will be up and that the present cancellations are more foreign than domestic. August shipments are \$32,500,000; new orders, \$29,500,000; cancellations, \$26,200,000; unfilled orders, \$217,500,000.

## COMING EVENTS

- Oct. 18—Business Session, Annual Meeting, American Welding Society, Hotel Pennsylvania, New York.
- Oct. 23-24—Seventeenth Annual Convention of the Gray Iron Founders' Society, La Salle Hotel, Chicago.
- Oct. 24—Annual Meeting, Porcelain Enamel Institute, William Penn Hotel, Pittsburgh.
- Oct. 24-25—1945 Annual Convention, Machinery Dealers National Assn., Congress Hotel, Chicago.
- Nov. 6-7—SAE National Fuels & Lubricants Meeting, Mayo Hotel, Tulsa, Okla.
- Dec. 3-5—SAE National Air Transport Engineering Meeting, Edgewater Beach Hotel, Chicago.
- Jan. 7-11—SAE Annual Meeting and Engineering Display, Bock-Cadillac Hotel, Detroit.
- Jan. 21-23—1946 Convention of Institute of Scrap Iron & Steel, Inc., Congress Hotel, Chicago.
- Feb. 4-8—Twenty-Seventh National Metal Congress and Exposition, Public Auditorium, Cleveland.

## OPA Authorize Docking And Trucking Charges

Washington

• • • OPA has announced that, effective Oct. 13, dock operators may add to cast iron scrap ceiling prices the full dock charge permitted for handling scrap accumulated for water shipment, but which WPB allocates for rail shipment. These charges range from 50¢ to \$1.25 per gross ton.

The changes in iron and steel scrap pricing also require that sellers hereafter supply buyers with shipping notices in sales of steel scrap, giving a description of the separate grades in the car, if each grade is to be sold at its ceiling price. If the shipping notice does not list the grades and amounts of each, then the ceiling price for the shipment is (1) the maximum price for the lowest grade of scrap in the car when the entire car is loaded, or (2) the maximum price for the grade which the consumer unloads when part of the car is unloaded and the remainder returned to the shipper.

Further, OPA has announced an increase from \$1 to \$1.50 per gross ton in the minimum trucking charge for cast iron scrap where delivery is made solely by truck owned or controlled by the shipper or broker.

The above shipping notice requirements are also extended to shipments by motor truck. These provisions re-

quire the shipper or broker to supply the buyer with a shipping notice describing the shipment before he can collect trucking charges in excess of the minimum of \$1.50 per gross ton which he can make for cast iron scrap, irrespective of trucking distance, when delivery is made in a truck owned or controlled by him.

## Institute Meets

Washington

• • • The Institute of Scrap Iron and Steel has announced a change in its plans for the 18th annual convention which will be held in Chicago on Jan. 21, 22, and 23. Headquarters of the convention will be at the Congress Hotel. Not long ago it was announced that this convention would be held in St. Louis earlier the same month.

## RFC Delays Termination Scrap

Chicago

• • • Criticism of slowness of completing sales of termination scrap has been voiced by the scrap trade. Although Army Ordnance has acted quickly in recommending disposition, approval for shipment by the RFC is said to have held up flow of scrap into trade channels.

## To Scrap \$50 Million Of Surplus Material

Buffalo

• • • Plans to scrap \$50,000,000 worth of surplus war materials in area plants of Curtiss-Wright, Bell Aircraft and Chevrolet have been announced by the Army's Air Transport Service Command.

Sub-assemblies, fabricated parts, work in process, special tools and equipment for C-46 transport planes, valued at more than \$25,000,000, will be scrapped at the Kenmore and Buffalo Curtiss plants.

Surplus and uncompleted parts and components for Pratt & Whitney R-2800 and other aircraft engines produced by Chevrolet will exceed \$40,000,000, of which \$20,000,000 in unsalable parts will have to be scrapped.

Unsalable assemblies, wings, rudders, tools and fixtures valued at \$4,000,000 are to be junked at Bell Aircraft.

Plant clearance and material disposal activities in major war plants here are being increased, the ATSC reported.

## Columbia Adds to Staff

Cleveland

• • • Boyd J. Outman and Nathan L. Fribourg have become associated with the Columbia Iron & Metal Co., according to an announcement by I. G. Shapiro, office manager.

**PIG IRON OUTPUT DOWN:** A recession in steel operations, fuel shortages and periodic strikes combined with the need for repairs continued to take blast furnaces down in August. Blast furnaces in the country during that month operated at 74.3 pct of capacity, compared to 84.1 pct in July and 83.1 pct in June. Present indications are that September figures when released will not show any betterment.

## American Iron and Steel Institute

	Number of Companies	Annual Blast Furnace Capacity	PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL		Per Cent of Capacity	
									August	Year to Date
			August	Year to Date	August	Year to Date	August	Year to Date		
<b>DISTRIBUTION BY DISTRICTS:</b>										
Eastern.....	12	12,988,970	809,637	6,671,365	32,632	251,748	842,169	6,923,114	76.3	80.0
Pittsburgh-Younstown.....	15	25,904,240	1,653,278	15,353,363	23,314	167,886	1,676,592	15,521,048	76.2	82.9
Cleveland-Detroit.....	7	6,569,500	406,398	3,614,005			406,398	3,614,005	72.4	86.9
Chicago.....	7	14,070,810	850,912	6,114,485		15,136	850,912	6,129,621	71.2	81.8
Southern.....	8	4,924,870	325,687	2,912,917	11,935	97,438	337,625	2,910,355	80.7	79.6
Western.....	4	2,536,000	185,740	1,225,096			185,740	1,225,096	66.3	64.9
<b>TOTAL.....</b>	<b>37</b>	<b>67,313,890</b>	<b>4,180,766</b>	<b>37,671,261</b>	<b>67,781</b>	<b>531,968</b>	<b>4,248,547</b>	<b>38,203,249</b>	<b>74.3</b>	<b>85.2</b>

## Industrial Briefs...

• **BUYS FOUNDRY** — Fort Pitt Steel Casting Co., McKeesport, Pa., has been purchased by Pittsburgh Steel Foundry Corp., Glassport, Pa., and will be operated as the Fort Pitt Div. of Pittsburgh Steel Foundry Corp. T. F. Dorsey has been named manager of the division.

• **TALON PLANT SOLD** — Talon Corp.'s No. 9 Plant at Meadville has been sold to the Westinghouse Electric Corp. Employing about 200, the plant will begin production about Jan. 1, 1946, on a complete line of about 20 Westinghouse industrial heating appliances.

• **HANDBOOK EDITOR**—Dr. Taylor Lyman has been made editor of the ASM Metals Handbook. As editor, Dr. Lyman will also serve as secretary of the Metals Handbook Committee and as editor of the Buyers' Guide and Data Book, published annually by the society.

• **BUYS NEW SITE** — Electromaster, Inc., manufacturer of electric ranges, water heaters and accessories at Detroit, has purchased a 23-acre site in the northwest section of the city. A new brick and steel plant built on one floor will be erected, with a center section of approximately 75,000 sq ft to go up immediately.

• **POSTWAR LOCATION**—Ironrite Ironer Co. has bought the former Covered Wagon plant, and will move to Mt. Clemens, Mich. This transfer gives Ironrite double its former manufacturing space. Ironrite lays claim to doing 40 pct of the ironer business in its class.

• **NEW PRODUCT** — A new 1cl (less-than-carload) container made of aluminum has been developed by the Reynolds Metals Co. and two test models have been completed at Reynolds plant No. 14, Louisville. The two test models will be put into immediate use between Rey-

nolds plants around the country before designs are turned over to manufacturers for production.

• **BRAZILIAN PLANT** — Rheem Mfg. Co. has begun construction on a new plant in the Cordovil section of Rio de Janeiro for the manufacture of steel shipping containers for the petroleum, alcohol, paint and vegetable oil industries in Brazil. It is expected that the plant will be in full operation by March 1, 1946.

• **BUYS RACINE FIRM**—Howard Aircraft Co., St. Charles, Ill., has purchased the Electric Motor Corp., Racine, Wis., established by I. H. Dunham, who will remain with the firm temporarily.

• **LACLEDE EXPANDS** — Laclede Steel Co. has announced an extensive expansion program of its three steel mills in the St. Louis area. At the company's Alton works, an expansion program is now underway. The company will install a new rod mill during 1946. A new general mill office, laboratory and engineering building is now under construction. The company also contemplates expansion of tube mill production facilities in the near future. At the company's Madison works the company will erect in 1946 a building to provide additional facilities to handle bars and shapes. Also at this plant the expansion of a steel joist fabrication department is contemplated.

• **ENLARGING PLANT**—American Stove Co. has underway a reconversion program which includes the construction of a two-story factory and warehouse building adjoining its present plant at an estimated cost of between \$900,000 and \$1,000,000. The building is expected to be completed about May 1 and will provide 300,000 additional sq ft of floor space.

## Propose War Surpluses Be Used for Trading

Washington

• • • Disposal functions relating to surplus military supplies overseas will be transferred to the State Dept., OWMR Director John W. Snyder told the Senate War Investigating (Mead) Committee recently.

Mr. Snyder cited the possibility of using these surpluses in the formulation of foreign policy and suggested that agreements could be worked out to trade excess war material for commercial and military concessions abroad.

There are not sufficient dollar balances abroad to permit cash purchases, Mr. Snyder pointed out. If more dollars are spent for surpluses abroad, less will be available to pay our exporters for steel and other products which we produce, he added.

Legislation will be required, however, to dispose of surplus property on other than a cash basis and such authority will be requested of Congress in the near future.

Thomas B. McCabe, head of the Army-Navy Liquidation Commission which has heretofore been charged with foreign disposals, told the committee that the United States has around \$3 billion invested in fixed installations abroad.

Mr. Snyder estimated the value of the six million tons of surplus American material in the European theatre to be around \$6 billion.

## Bar Facilities Expanded

Buffalo

• • • The Bethlehem Steel Co. has begun work on a \$20,000,000 modernization program of bar production facilities at its Lackawanna plant, designed to increase output of high quality carbon and alloy bars.

The program, according to Edward F. Entwisle, includes construction of a 10-in. bar mill at Woodlawn consisting of four new buildings and extensions of three present structures.

The billet mill in the main plant will be enlarged and the blooming mill modernized. The project is expected to be completed by next fall.

"Our primary objective is quality finished-steel products, not increased overall production," Mr. Entwisle explained. "Before the war we were not able to produce all the quality steel products we wanted or that industry needed. Now (when the program is completed) we will be able to do so."

## Claim Filing Still Delaying Payments

Boston

• • • Claims for money due contractors on terminated contracts are trickling in slowly, and millions of dollars needed for reconversion are lying idle because of failure to file claims, according to Capt. J. J. Hyland, USN (Ret), Inspector of Naval Material for the Boston inspection district.

If claims are not filed at the navy Office before Oct. 15, they may have to go to the General Accounting Office in Washington, with considerable delay before settlement.

He emphasizes that claims for money due thousands of firms cannot be held over until 1946 to escape 1945 income taxes. Many contractors have put off filing such claims under the impression that if they file after the year's end and are paid in 1946, they can consider this money 1946 income. Laws state specifically that income from termination work must be included in tax filings in the year that the contract was terminated, unless the contractor is working on a cash basis.

When a contractor files his claim he is entitled to 2½ pct interest on the amount of the claim from 30 days after its filing until it is paid. However, if the claim is not filed in a reasonable time the government can refuse to pay this interest.

## Discuss Export Trade

Washington

• • • Early resumption of unrestricted trade and the need of continuing government assistance to exporters on foreign trade problems were discussed at a recent meeting of the Foreign Economic Administration's Export Advisory Committee. FEA Administrator Crowley told the group that the government should continue development of foreign commercial policies in the postwar period.

Problems arising from procurement in the United States by foreign purchasing missions was discussed by the members with Donald D. Kennedy, Chief of the Commodities Division, State Dept.

Among the members attending the meeting were: W. S. Morrison, U. S. Steel Export Co., New York; Eric C. Gyllensvard, Farrell-Birmingham Co., New York; C. B. Thomas, Chrysler Corp., Detroit; R. C. Thompson, Electric Auto-Lite Co., New York.

## Detailed Orders for Homecoming Soldiers

HEADQUARTERS

LAST U. S. ARMY

A.P.O. #001 U. S. ARMY

21 October 1945

ECLA 4110.99

SUBJECT: Indoctrination for Return to the United States.

TO: Commanding Officers, all units and attached units.

1. In compliance with current policies for the rotation of armed forces overseas, it is directed that, in order to maintain the high standards of character of the American Soldier and to prevent dishonor to reflect on the uniform, all individuals eligible for return to the U. S. under current directives will undergo an indoctrination course of demilitarization prior to approval of his application for return.

2. The following points will be emphasized in the subject indoctrination course:

a. In America there is a remarkable number of beautiful girls. These young ladies have not been liberated and many are gainfully employed as stenos, sales girls, beauty operators, or welders. Contrary to current practice, they should NOT be approached with "Come along Babe." A proper greeting is, "Isn't it a lovely day?" or "Have you ever been to Chicago?"

b. A guest in a private home is usually awakened in the morning by a light tapping on his door, and an invitation to join the host at breakfast. It is proper to say, "I'll be there shortly." DO NOT say, "Blow, slug."

c. A typical American breakfast consists of such strange foods as: cantaloupe, fresh eggs, milk, ham, etc. These are highly palatable and though strange in appearance, are extremely tasty. Butter, made from cream, is often served. If you wish some butter, you turn to the person nearest it and say quietly, "Please pass the butter." You DO NOT say, "Throw me the Goddam grease."

d. In the event the helmet is retained by the individual, he will refrain from using it as a chair, wash bowl, foot-bath, or bathtub. All these devices are furnished in the average American home. It is not considered good practice to squat, Indian fashion, in a corner in the event all chairs are occupied.

e. American dinners, in most cases, consist of several items, each served on a separate dish. The common practice of mixed various items, such as: corn beef and pudding, or lima beans and peaches, to make it more palatable will be refrained from. In time the "Separate Dish" system will become enjoyable.

f. The Americans have a strange taste for stimulants. The drinks in common usage on the continent, such as under-ripe wine, alcohol and grapefruit juice or gasoline bitters and water (commonly known as French Cognac by them) are not usually acceptable in civilian circles. A suitable use for such drinks is for serving one's landlord in order to break an undesirable lease.

g. The returning soldier is apt to find often that his opinions differ from those of his civilian associates. One should call upon his reserve of etiquette and correct his acquaintance with such remarks as: "I believe you have made a mistake or I'm afraid you are in error on that." DO NOT say, "Brother, you're really fouled up!"

h. Upon leaving a friend's home after a visit, one may find his hat misplaced. Frequently, it has been placed in a closet, and one should turn to one's host and say: "I don't seem to have my hat. Could you help me to find it?" DO NOT say: "Don't anybody leave this room, some ——— has stolen my hat!"

i. In traveling in the U. S., particularly in a strange city, it is often necessary to spend the night. Hotels are provided for this purpose and almost anyone can give directions to the nearest hotel. Here, for a small sum, one can register and be shown to a room where he can sleep for the night. The present practice in the E.T.O. theatre of entering the nearest house, throwing the occupants into the yard and taking over the premises will not be permitted.

j. Whiskey, a common American drink, may be offered to the soldier on social occasions. It is considered a reflection on the uniform to snatch the bottle from the hostess and drain the bottle, cork and all. All individuals are cautioned to exercise extreme control in these circumstances.

k. In motion picture theaters, seats are provided. Helmets are not required. It is not considered good form to whistle every time a female over 8 and under 80 crosses the screen. If vision is impaired by the person in the seat in front, there are plenty of other seats which can be occupied. DO NOT hit him across the back of the head and say: "Move your head, Jerk, I can't see a damned thing!"

l. It is not proper to go around hitting everyone of draft age in civilian clothes. He might have been released from the service for medical reasons. Ask him for his credentials, and if he can't show any, THEN go ahead and slug him!

m. Upon retiring, one should or will often find a pair of pajamas laid out on the bed. (Pajamas, it should be explained, are two piece garments which are donned after all clothing has been removed.) The soldier, confronted by these garments should assume an air of familiarity and not act as though he were not used to them. A casual remark, such as: "My, what a delicate shade of blue," will usually suffice. Under no circumstances say: "How in the hell do you expect me to sleep in a get-up like that!"

n. Beer is sometimes served in bottles. A cap remover is usually available and it is not good form to open the bottle by use of one's teeth.

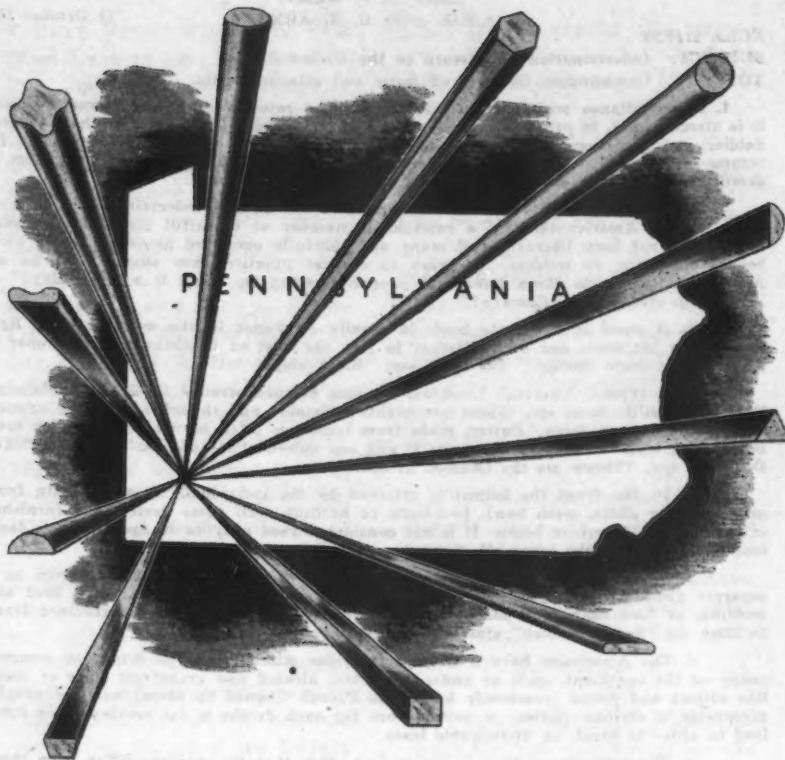
o. Air raids and enemy patrols are not encountered in America. Therefore, it is not necessary to wear the helmet in church or at social gatherings, or to hold a weapon at the ready, loaded and cocked position, when talking to civilians in the street.

p. Every American home and all hotels are equipped with bathing facilities. When it is desired to take a bath, it is NOT considered good form to find the nearest pool or stream, strip down, and indulge in a bath. This is particularly true in heavily populated areas.

BY Command of Lieutenant General STRICTANDROW:

/s/ W.G. Affairs  
/s/ W.G. AFFAIRS  
Colonel, A.G.D.  
Adjutant General

# PAGE *Stainless Steel* WIRE



● For many years, manufacturers in all branches of industry have looked to PAGE for uniformly high quality wire. For wire has always been the business of PAGE. And stainless steel wire has been a PAGE specialty since the early days of stainless.

PAGE wire—round, flat or shaped—is available in section areas up to .250" square; in widths to 3/8". In addition to various analyses of stainless, PAGE wire is made of high or low carbon steel or Armco ingot iron. Finishes, lengths, packaging to your specifications.

For wire or information about the best use of wire . . .

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PAGE STEEL AND WIRE DIVISION  
AMERICAN CHAIN & CABLE

## NEWS OF INDUSTRY

### Construction Machinery Price Ceiling Raised

Washington

● ● ● An interim increase of 5 pct in the ceiling prices for basic construction machinery and equipment was announced by OPA.

This upward adjustment is at the manufacturers level, OPA said, and may be passed through at all levels of distribution.

Amendment 13 to MPR 136 (machines, parts and industrial equipment) which made the increase effective immediately, covers more than 100 classifications of items including cranes, dredges, drills, graders, concrete mixers, loaders, road maintenance equipment pavers, rollers, street sweepers, track-laying and industrial wheel tractors, half-track trucks and crawler wagons.

This increase was authorized, OPA said, to relieve pricing problems and financial hardships now confronting construction and building machinery manufacturers as a result of the war's ending and, also, to insure a high level of production.

This increase, it was pointed out, may be applied to the published or established prices.

In effect on Oct. 1, 1941 or to base date list prices modified to reflect cost differences resulting from changes in design, specifications or equipment.

The increase may not be applied, however, to prices determined by formula or ceiling prices established after Oct. 1, 1941 reflecting current labor efficiency and current maximum prices for parts, subassemblies and subcontracting services. It also may not be applied to ceiling prices that have been adjusted upwards on account of hardship since Oct. 1, 1941.

### Wartime Tools at \$4.5 Million

Washington

● ● ● Wartime production of machine tools during the five-year period 1940 through July, 1945, reached the astronomical figure of \$4,480,440,000, an increase of almost 500 pct over the total of \$747,000,000 produced in the preceding five-year period, WPB announced on Oct. 2. Production in 1942, the high year for the war, was \$1,321,748,000 compared with \$85,000,000 for 1935, the low year.

# MRS. MOSQUITO DIDN'T LIVE HERE VERY LONG!



**EVERYONE KNOWS** how tricky and treacherous an enemy the Jap proved to be—while he lasted. But even more elusive and almost as vicious a foe of our fighting forces was Mrs. Mosquito, whose bite carries malaria, yellow fever and other serious diseases.

Many ways of fighting the pest were tried in this war with varying degrees of success. One of these that *did work* was the new, highly potent insecticide, DDT, which remains effective on solid surfaces for amazing lengths of time. This insecticide, mixed with oil, was commonly applied by a portable outfit of DeVilbiss spray equipment, quickly adapted to the special requirements of the job by DeVilbiss spray engineers working in co-operation with the U. S. Engineers Corps.

From DeVilbiss' 57 years of spray experience

and the four DeVilbiss lines—spray equipment, exhaust systems, air compressors, hose and connections—these same DeVilbiss engineers can just as quickly give *you* the best system for applying any material to any surface by spraying.

If you are considering new or revised spray methods for your peacetime product, let us send one of these spray experts to analyze your problems *now*. Here's time-saving, money-saving counsel at no obligation to you.

**THE DEVILBISS COMPANY, TOLEDO 1, OHIO**

Canadian Plant: Windsor, Ontario



## DE VILBISS

### *Spray Systems*

**SPRAY EQUIPMENT • EXHAUST SYSTEMS • AIR COMPRESSORS • HOSE & CONNECTIONS**

## A DRAWING BOARD IN A *Foundry?*



### *No!*... but Acme Aluminum Castings Service does include engineering design

WE don't put our drawing boards right out on the foundry floor. But Acme does offer a design service which has proved helpful to many users of Acme Permanent Mold Aluminum Castings. Acme engineers, through their long experience in making tools and patterns, and in working with aluminum and its alloys, can frequently suggest constructive changes in design. Such a change may, for instance, lead to the use of less metal with no sacrifice in casting strength, and a saving to the customer.

Whether or not you call upon the advisory service of Acme engineers, you will gain the benefit of modern production facilities and quality control in the production of your castings. Acme facilities include pattern and tool shop, as well as one of today's most modernly equipped foundries. Close temperature control and rigid inspection methods guard the quality of every Acme casting.

Submit your castings problems to the Acme organization. You'll find that Acme experience and Acme facilities will help you enjoy higher production rates and lower production costs.

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*Aluminum Alloys, Inc.*

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## NEWS OF INDUSTRY

### Assistance Given To Increase Output Of Cast Iron Soil Pipe

Washington

... Producers of cast iron soil pipe will be given every possible assistance to increase production required for the expanded building program, WPB announced recently.

Cast iron pipe production has been retarded by the shortage of foundry workers, especially molders. The principal problem, WPB pointed out, is the recruitment of manpower so that plants which have been closed may resume production and operate at capacity levels. More than half of the 52 plants were closed down during August. Two have since reopened in the Tennessee-Alabama area which accounts for around 65 pct of total production and others are being reopened soon, WPB said.

Joint meetings have been held by WPB and Labor Dept. officials to assist in recruitment of needed manpower. It is expected that as a result of the already improved manpower situation, production in the Tennessee-Alabama area will increase one-third by December. Ten of the 24 closed foundries are expected to be in production by Nov. 1, it was said.

With average monthly production of 30,000 tons needed to meet 1946 requirements, WPB estimates that December production will approximate 20,000 tons. July production of cast iron pipe and fittings totaled 12,500 tons and production during September is estimated at 16,000 tons.

### Less Than 5-Yr Write Off Allowed on Plants

Washington

... Contractors may now write off the cost of privately financed war plants and facilities in less than five years without having to file individual applications for certificates of non-necessity, the WPB said on Sept. 29.

This action which was covered by a Presidential Proclamation ending the emergency period under Section 124 (E) (2) of the Internal Revenue Code, is intended to allow holders of necessity certificates to deduct the portion of costs already certified against their wartime income without requiring them to apply for non-necessity certificates.

Necessity certificates which are

# The CONE AUTOMATIC MACHINE COMPANY



sees many

## GOOD THINGS AHEAD

**It is reported that . . . . .**

The National Research Council is compiling a directory of industrial research laboratories of which there were 2,264 in 1940 when the last listing was made.

get ready with CONE for tomorrow

Said to be the largest government-owned plant yet leased for civilian use, a 21 million dollar factory is being converted for the making of streamlined trains. *Edward G. Budd, Philadelphia.*

get ready with CONE for tomorrow

Experimental track-type tractors are using rubber tracks quite similar to those used on children's toys. *B. F. Goodrich.*

get ready with CONE for tomorrow

A new technique, using an electric arc, makes it possible to cut industrial diamonds four times faster than the conventional method. *National Bureau of Standards.*

get ready with CONE for tomorrow

An aviation magazine estimates that American domestic and international air carriers will put almost \$750,000,000 in equipment in the next five years. *Aviation News.*

get ready with CONE for tomorrow

A unique type of power transmission, which is positive and yet prevents gear breakage in case of jamming, uses metal gears meshed with gears of an elastic vinyl resin. *Resistoflex Corp.*

get ready with CONE for tomorrow

Tooling has begun for the production of a calculating machine that automatically figures dividends, hourly pay rolls, writes checks and keeps records at 4,000 per hour speed. *Addresso-Multi-graph Corp.*

get ready with CONE for tomorrow

A dry cell developed for the Army is reported to have 5 times the shelf life of ordinary batteries. A 93.6 volt radio battery of 72 cells weighs only 2 pounds. *Engineering & Mining Journal.*

An oxy-acetylene cutting unit developed by the Navy can be carried on the operator's back and used without setting it down.

get ready with CONE for tomorrow

One of our admirals reports that welded ships have proved to be stronger than riveted ones during the war. *Admiral Emory S. Land.*

get ready with CONE for tomorrow

The American optical industry is now producing, by automatic, mass production methods, lenses superior to those formerly made by hand in Germany.

get ready with CONE for tomorrow

The Army has been using a very compact radio communication system that can carry facsimile pictures, telephone conversation and teletype messages all at once.

A new pocket-size instrument reports power output and efficiency to the pilot of a plane by measuring constantly the deflection of the engine under the force of explosions. *Consolidated-Vultee.*

get ready with CONE for tomorrow

Claims for a new rubber cement include adhesion to metals, plastics and ceramics; shear strength of 3,250 pounds per square inch and tension strength of two tons. *B. F. Goodrich, "Plastilock"*

get ready with CONE for tomorrow

The first section of the Society of Automotive Engineers to be established outside continental United States has been organized in the Hawaiian Islands.

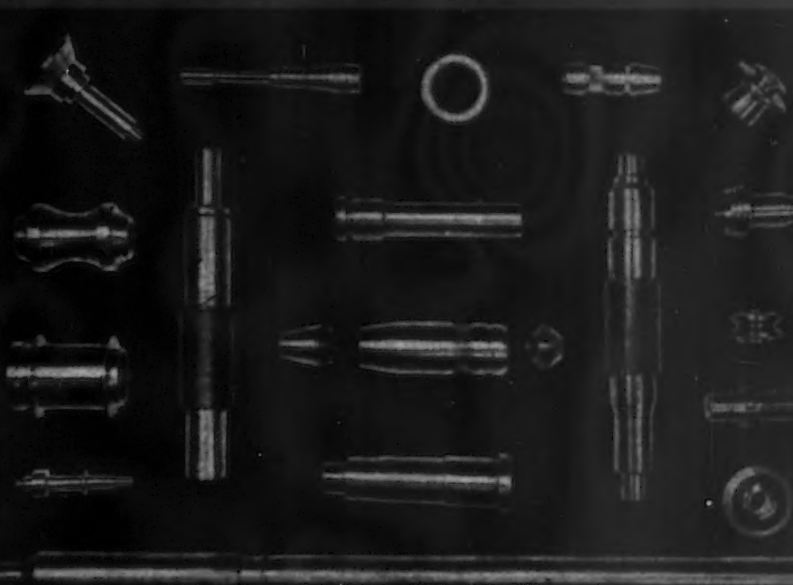
get ready with CONE for tomorrow

A new electrical device analyzes the composition of metal and indicates its maximum endurance. *Electrical Manufacturers Public Information Center.*

get ready with CONE for tomorrow

A new stainless steel is soft and ductile enough to be formed and fabricated like aluminum. *Rustless Iron & Steel Corp., Baltimore.*

*Keep ahead with production savings from parts produced on the 3-Spindle Conomatic.*



# CONE

AUTOMATIC MACHINE CO. INC. ★ WINDSOR, VERMONT, U. S. A.

22

## WANT TO USE THAT CEILING SPACE

# for Storage?

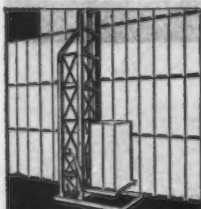


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justable up to 7½, 8½, 9½, and 10½ feet; stacks commodities as high as 12, 13, or 14 feet. Handles individual items up to 100 lbs. Motor mechanism in base frame—plug into any convenient outlet. Write for Bulletin No. IA-105

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LIFTING MACHINES**



**PORTABLE  
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CHUTES**



**PNEUMATIC  
TUBE SYSTEMS**

## NEWS OF INDUSTRY

issued by WPB and earlier by the War and Navy Depts. certify that a privately financed plant expansion or new facility was "necessary in the interest of the national defense" and formerly permitted holders to amortize the cost over a five-year period for income tax purposes. The new ruling, it was pointed out, now permits amortization over a shorter period of time provided the amortization period begins not later than five years from the date of the proclamation.

Taxpayers electing to take the increased deductions thus allowed, must spread them evenly over the shorter period, WPB said. They must also file with the Commissioner of Internal Revenue in Washington a statement of election giving a clear description of the facilities involved. This must be filed within a period of 90 days from the date of the proclamation, WPB said.

## Metal Stamping Group Selects Its Officers

New York

• • • National and district postwar committees of the Pressed Metal Institute have been appointed, it is stated by F. C. Greenhill, president.

The Institute has completed the organization of ten national working committees and ten parallel committees in each district. Each national committee comprises a chairman appointed by the president and nine members, one from each district. These district members also serve as chairman of their local committee. Through the reports of frequent district committee meetings the local chairmen keep their national chairman posted and assist in formulating national policies.

The following committee chairmen have been appointed: public relations, Harvey S. Johnson, The Metal Specialty Co.; promotion, Walter C. DeMaris, Heintz Mfg. Co.; technical, Walter T. Baird, Toledo Pressed Steel Co.; research, Carter C. Higgins, Worcester Pressed Steel Co.; membership, R. F. White, Mullins Mfg. Co.; program, Sam Morrison, Morrison Steel Products, Inc.; dues and assessment, C. W. Cederberg, Larson Tool & Stamping Co.; talent, Steven J. Menzel, Motors Metal Mfg. Co.; inquiries, I. R. Morris, National Formetal Co.; directory, J. H. Robins, The American Pulley Co.; gifts, Glendon H. Roberts, Detroit Stamping Co.

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OILS . . . FLUIDS . . . COMPOUNDS**

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**Fast, versatile load-handler  
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tons all around your plant**

**Y**OU have no load-handling emergencies when you have a Roustabout — whether it's a special car or truck loading job, a heavy machine to be moved, any usual or unusual handling situation, Roustabout is where you want it when you want it, quick, powerful, low cost — saving time and manpower. Easily, smoothly, it lifts 2 tons at 27½ ft. radius, 10 tons at 9½ ft. Boom turntable and all gears run in oil; built for years of overwork. Hundreds of industries regard their Roustabouts as indispensable. Write today for full story of these money-saving wheel or crawler cranes.

**Roustabout saves you time  
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**THE HUGHES-KEENAN COMPANY**  
571 Newman Street, Mansfield, Ohio

## Roustabout Cranes

By Hughes-Keenan

Load-Handling Specialists Since 1904

## WPB and NHA Announce New Housing Ceilings Have Been Eliminated

Washington

• • • With sales price and rental ceilings no longer set on new housing after Oct. 15, following the lifting of WPB construction controls, such ceilings have been eliminated on new construction authorizations issued by National Housing Agency between the present and that date, WPB and NHA have announced. This change has been made by an amendment to WPB's Directive 24, which delegates to NHA power to give authorization for housing under the construction order, L-41.

OPA said that in all areas under OPA rent control maximum rents in newly constructed housing for which no rent has been set by NHA will be determined by the first rent charged for the housing, subject to adjustment by the OPA area rent director. All newly constructed housing units in rent control areas must be registered with the area rent office within 30 days after they are first rented, OPA said.

Many builders, the two agencies said, have held up their applications awaiting the lifting of L-41 controls, and the amendment has been issued in order not to slow down future housing construction.

The Federal Housing Administration (unit of NHA) began approving housing applications as of Oct. 1 without regard to previous limitations upon sales and rental ceilings, it was announced. After Oct. 15 no authorization will be necessary to start new housing construction.

## Dresser Nets \$2,167,735

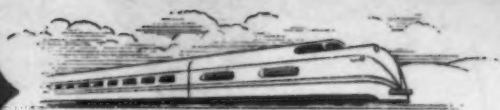
Cleveland

• • • Net earnings of Dresser Industries, Inc., Cleveland, for the nine months ended July 31, 1945, after taxes but before renegotiation, totaled \$2,167,735, according to quarterly report to shareholders made public recently. Consolidated net sales for the period, covering operations of 13 member companies in the fields of gas and petroleum, were \$66,191,470.

Despite contract cancellations following the end of hostilities amounting to \$16,850,000 up to Aug. 31, as of Aug. 31 the company's remaining backlog of unfilled orders amounted to \$20,738,000, equivalent to four months' operations at a more normal rate. Of this total, only 8½ per cent consisted of continuing war business.



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THAT KEEP  
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## Snyder Predicts 8 Million Unemployed

Washington

••• "There is much reason for optimism, none for complacency", according to OWMR director John W. Snyder in the quarterly report "Three Keys to Reconversion — Production, Jobs, Markets" submitted to Congress on Oct. 1.

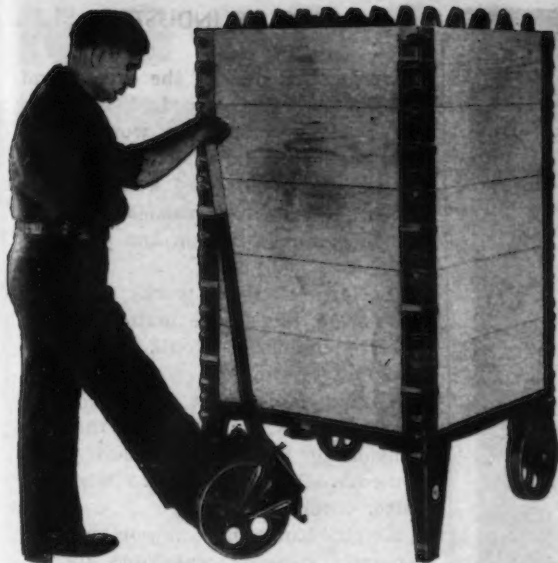
Predicting that high unemployment with a peak of about 8 millions will persist through 1946 because industry cannot possibly reemploy workers as fast as they are demobilized, the report describes the reconversion period as paradoxical with inflation and deflation at work simultaneously in various sections of the country. Although prospects are that there will be markets for all durable and most non-durable goods than can be produced, industry will be unable to achieve maximum employment because of the time required to organize the flow of production, the report states.

For that part of the economy having markets but needing manpower materials and plant capacity, government policies are aimed at helping business get them. Furthermore, the report adds, where markets are not developing, policies are designed to support both income and markets.

A great deal depends on translating potential consumer demand into production, sales and jobs as quickly as possible, Mr. Snyder points out, inasmuch as our economy cannot carry on solely out of accumulated savings which are largely in the hands of the middle and higher income groups. There must not be a serious block to reemployment, for both management and labor have the same long run interests—more production, more sales and more jobs, he said.

Illustrating the plentiful supply of most materials and equipment for reconversion uses, the report states that steel available for civilian production has doubled—from 8.2 million tons to more than 14.5 million tons quarterly. This represents a 30 pct increase over the all-time high for peacetime consumption attained in 1929.

Mr. Snyder recommends a three-point interim tax plan, as follows: Repeal of the 3 pct normal tax on individual incomes in order to restore purchasing power particularly in the lower income groups. Establishment of a definite date for reduction of wartime excise taxes to the

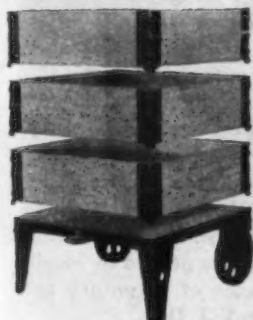


The Transport, carrying Bin Sections or other units, can be moved in restricted space by the hand Jimmy, power lift truck, crane or conveyor.

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Floor Plate Deck Transport provides point contact with hot materials. Non-skid embossments hold materials on deck.

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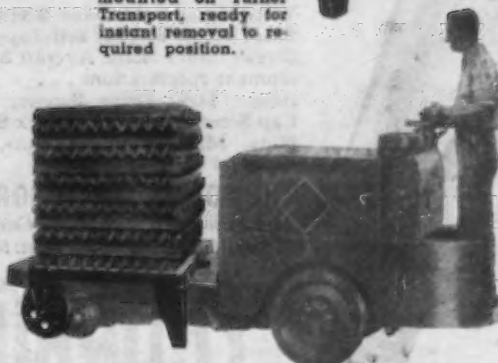
Illustrations shown here indicate just a few of the ideas of vertical expansion, complete mobility and orderly storage in the **TURNER SYSTEM**. You can get a complete outline of it in a twenty page book sent without charge to established companies. Write on your letterhead for your copy.



Shop Box Racks mounted on Turner Transport, ready for instant removal to required position.



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*Screws Nuts Chain*

1942 level. Repeal of the excess profits tax effective Jan. 1, 1946. Such a move, the report says, would stimulate industrial expansion, make higher wages possible and would remove the brake previously needed as a safeguard against inflation and profiteering.

A large public works program competing for scarce materials with private enterprise would be an unsatisfactory answer to the transitional unemployment problem, Mr. Snyder states, pointing out that expansion of private construction and non-competing public works would be better alternatives.

Emphasizing the importance of promptly clearing warplants for civilian use, the report declares that the government's obligation of making them available within 60 days has been met. Of 5757 clearances of inventories during August, 4526 required less than 40 days; 954 out of 1250 plants were cleared of equipment within 40 days and only 17 required more than 60 days.

Storage space is a critical problem in plant clearances, Mr. Snyder said, with additional space needed to handle augmented releases of inventory and equipment since V-J Day.

Emphasizing that price controls must be continued to prevent an inflationary price rise which would be the inevitable forerunner of collapse, the report states that OPA will continue to stabilize the cost of living and the general level of business costs. Consistent with this general policy, it is said, OPA will suspend price ceilings product by product and will correct inequities or maladjustments. Utilization of the 708,473 items of government-owned industrial equipment—about half of them machine tools—and the approximately 1700 government-owned plants is essential to the attaining of high level production and employment, Mr. Snyder states.

The large quantity of industrial supplies and raw materials—steel, industrial diamonds and paper—in government stocks and contractors' inventories, it is pointed out, entails the problem of making them available as speedily as possible. Today, they would speed reconversion; six months from now they will have far less value and utility, the report adds.

Surpluses at the end of September totalled \$5.6 billion. Of this amount, goods having initial cost of \$647 million had been disposed of for around \$344 million, the report revealed.

# INGERSOLL

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• You purchase *one* cutter housing for each application.

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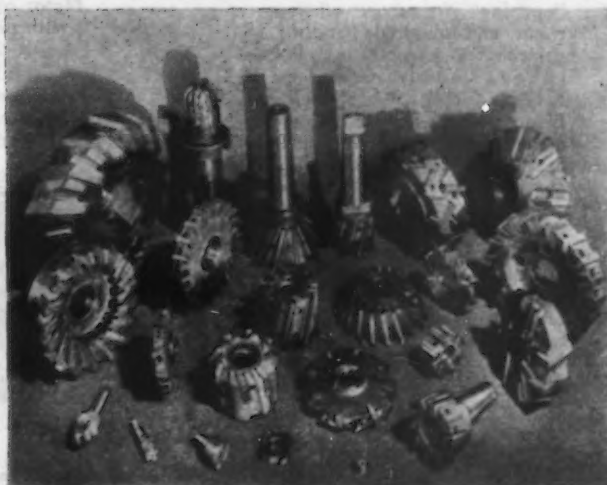
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Ingersoll offers many designs of *inserted blade* milling and boring tools — Face mills, end mills, slotting cutters, helical slabbing mills, cylinder boring, combination boring, chamfering and facing. Ingersoll blades are lowest in replacement cost and over 50% useable.

When a solid type cutter has worn down it is necessary to invest in another complete cutter. With *inserted blade* design the housing is a capital investment and only the blades are a continuing operating expense.

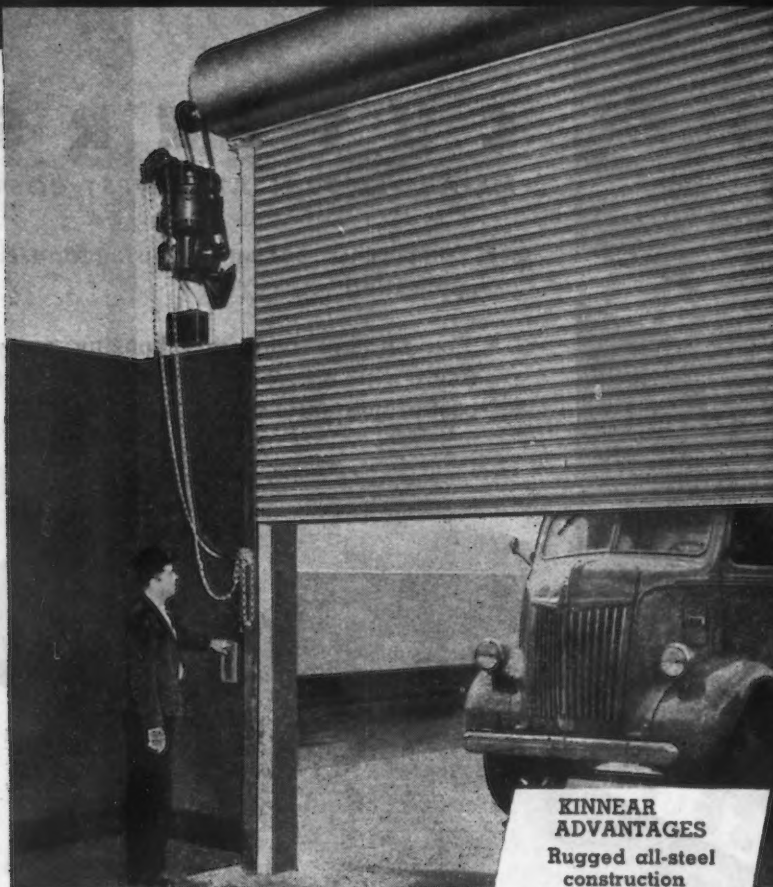


Write for catalog giving complete details of Ingersoll *inserted blade* milling and boring tools.



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Rugged all-steel construction  
Coiling upward action  
Effective counter-balance  
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## NEWS OF INDUSTRY

### Engineer's Report Details Controls For All Germany

New York

... A five-point program for strict control of German industry, from raw materials to processing and scientific research, in order to prevent rearmament, formulated by the National Engineers Committee on the basis of studies made by 35 leading engineers and technological specialists, was made public today after transmission to the appropriate U. S. authorities in Washington and abroad.

The National Engineers Committee was requested last February to make a study and to suggest measures for postwar control of German war potential. The request of the Council was supplemented by the approval of the State and War Departments.

Working within the framework of the Yalta and Potsdam agreements, the engineering group concludes that assurance that Germany will keep the peace requires institution and maintenance of effective controls of power production and distribution and industrial plant construction. Restrictions should, among other things, do the following:

(1) Prohibit the production of aluminum; (2) prohibit the development or use of atomic energy; (3) limit the capacities and production of steel and steel products plants.

It also is proposed to eliminate danger from secret scientific research by preventing coordination of such effort with development facilities under German control. Economic subsidies to industry by the German government also are ruled out as a fruitful source of future war strength.

Copies of the report and recommendations have been laid before the heads of the State Dept., the War Dept., the Navy Dept., the Commanding General of the Army Service Forces, and General Lucius D. Clay deputy to General Eisenhower for U. S. Group Control Council for Germany.

The Executive Committee of the Engineers' Joint Council are: The American Society of Civil Engineers, Malcolm Pirnie, past president; American Institute of Mining and Metallurgical Engineers, Harvey S. Mudd, president; the American Society of Mechanical Engineers, Robert M. Gates, past president; American Institute of Electrical Engineers, Charles A. Powel, president; and

# Getting Rid of the *JITTERS*



THE HELE-SHAW

## *Fluid Power* PUMP

OTHER  $\mathcal{A}$ E PRODUCTS:

$\mathcal{A}$ E-TAYLOR AND PERFECT SPREAD STOKERS,  
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### AMERICAN ENGINEERING COMPANY

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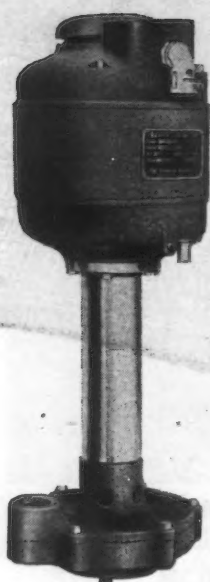
## A "Red Hot" Problem Solved by Hele-Shaw Fluid Power

Red hot metal poured from the ladle to the molds below. But it had the "jitters" . . . which of course caused trouble resulting in excessive rejects. The electrical tilting device was jerking and jarring the ladle and shimmying the flow of metal.

The remedy for this troublesome condition turned out to be Hele-Shaw Fluid Power (oil under pressure). A hydraulic lifting cylinder was hooked up to a special hand-lever controlled reversible Hele-Shaw Pump . . . and from then on pouring was smooth as a cat's purr.

Hele-Shaw Fluid Power provides safer, smoother operation in countless hydraulic applications. Go hydraulic with Hele-Shaw Pump, the power generator of the future, available to you today. Let us point out specific advantages for your needs.

## It's a question of BALANCE



MODEL  
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The long trouble-free life and minimum maintenance expense of Ruthman Gusher Coolant Pumps is due to their precision balance. The entire rotating assembly of Ruthman Pump is electronically balanced, assuring alignment and vibrationless rigidity of the one piece shaft.

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THE "GUSHER"

A MODERN PUMP FOR MODERN MACHINE TOOLS

American Institute of Chemical Engineers, Dr. Lawrence W. Bass, president. These societies comprise a national membership of about 80,000.

The National Engineers' Committee consists of Robert E. McConnell, New York, chairman; Harry S. Rogers, vice-chairman, president of Brooklyn Polytechnic Institute; Thomas F. Barton, commercial vice-president, General Electric Co.; Colonel Carlton S. Proctor, consulting engineer, New York; Dr. Edward R. Weidlein, director, Mellon Institute of Industrial Research, Pittsburgh, and Dr. Clyde E. Williams, director, Battelle Memorial Institute, Columbus, Ohio.



HARVEY S. MUDD

Thirty-five engineering and technological specialists

in their respective fields cooperated in the preparation of the report and recommendations.

In September 1944, the presidents of the five national engineering societies submitted to Washington and made public a general



CHARLES A. POWELL

program for the industrial control of postwar Germany. The current report now outlines a definitive program for control and gives the factual and statistical basis for elimination, prohibition or control of materials essential to armament.

The scope of the committee's studies, according to the directive of the Engineers' Joint Council to the National Engineers' Committee, includes industrial control of all aggressor nations. Its first report deals entirely with Germany.

The report is built around the expressed philosophy that "it is necessary to subtract from aggressor peoples, for a long period of recuperation, the fundamentals of their industrial war potential for armed aggression." At the same time it is held



CLYDE E. WILLIAMS

that "complete elimination of German industries, leaving agriculture as the sole occupation, would produce an economic dislocation and social chaos of destructive magnitude, not alone in Germany but throughout Europe."

It is pointed out that adequate enforcement of such complete elimination of industry would be practically impossible, and that such severe restrictions probably would be repudiated by world public opinion in a relatively short time, resulting in a repetition of the aftermath of World War I.

In contrast with this, framers of the engineers' report believe their recommendations would require a minimum of policing and remain effective so long as the policies of control are repeatedly adjusted, with the assistance of competent technical counsel, and adequately enforced by the policing agencies of the United Nations.

Recommended controls, the report states, would reduce employment of the total peacetime labor force in Germany by about five per cent, a displacement which should be absorbed easily by reemployment in peacetime agriculture and consumer goods industries.

The report details the industrial factors that must be controlled, supporting its findings with statistics and engineering data, but leaving the determination of the specific methods of control to the authorities charged with that function.

Control must be exerted, the report states, over (1) energy allocation; (2) raw material elimination or limitation, applied to specific elements critical to war industry; (3) processing, fabricating and new construction; (4) scientific research; (5) economic subsidies.

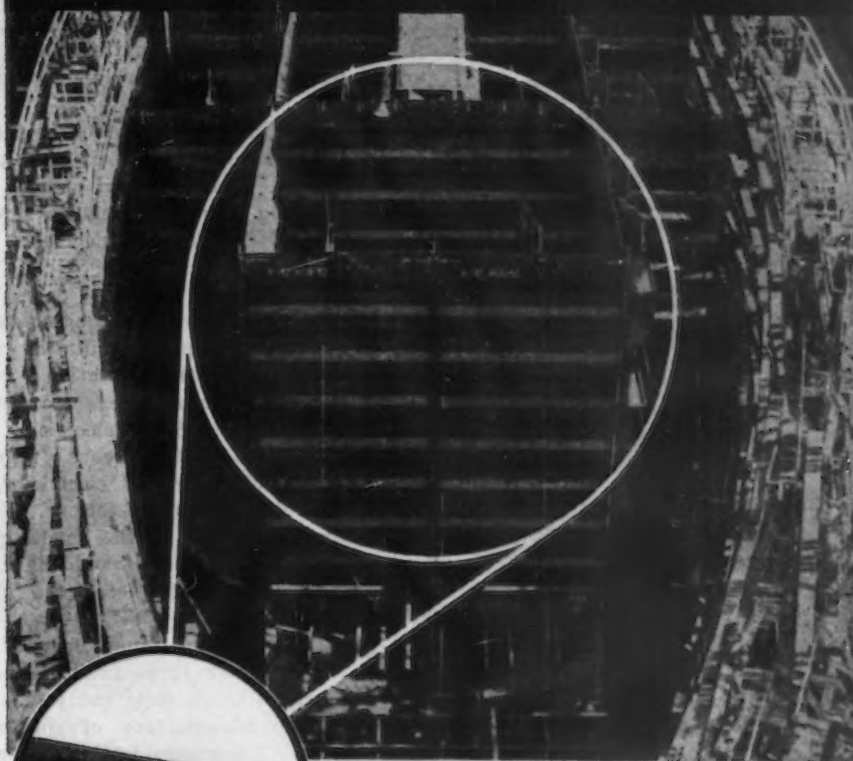
Even if ample energy were available, modern war would be impossible without a number of products required in large quantities, the report states, namely: nitrogen for explosives, aluminum for air power, steel and steel alloys for land and sea warfare, and liquid fuels and lubricants to insure mobility of the instruments of war.

In order to allow Germany aluminum only for peacetime uses, the engineers would eliminate the manufacture of the metal from raw materials and allow only a light fabricating industry. The recommendations follow:

"1. That all alumina producing and smelting plants within the borders of postwar Germany be eliminated, either by demolition or removal in accordance with the rec-

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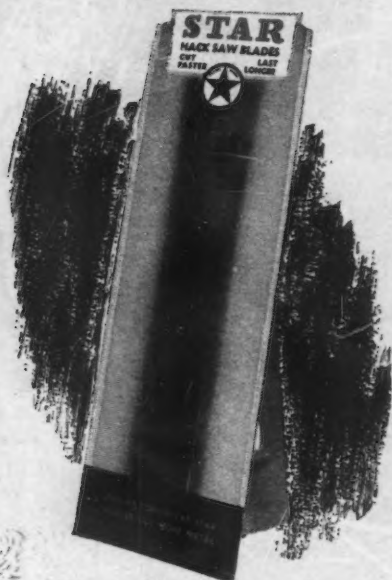
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## NEWS OF INDUSTRY

ommendation of the Reparations Committee.

"2. That importation of bauxite or any alumina ores, be prohibited, except for a limited amount to be used as such without smelting, as provided for hereinafter under import regulations (recommendation 8).

"3. That the production of petroleum coke and carbon paste be prohibited. The electrical process for smelting aluminum requires about .75 lbs of carbon for electrodes per pound of aluminum.

"4. That the control of energy be studied by competent engineers to determine the practicability of exercising long term regulation by the rationing of coal to generate power, either as steam or electricity, or exercising instantaneous regulations by control of electricity at central distributing stations. With the elimination of the smelting of bauxite this control would have its most direct application to the fabrication industry.

"5. That the aluminum fabrication industry in postwar Germany be restricted to light industry, such as the manufacture of consumer goods. The control in this case may be exercised by limitation of size and type of manufacturing equipment.

"6. That a quota for the quantity of aluminum and aluminum scrap to be imported by Germany be determined by competent authorities. It is further recommended that this quota be flexible and subject to periodic review and adjustment by the United Nations Control Council or some division thereof.

"7. That aluminum and scrap now stocked in Germany be seized and distributed in accordance with the foregoing plans.

"8. That the quantity of alumina used as such and aluminum compounds normally used in peacetime in such industries as the ceramic, manufacturing and chemical be determined and a quota based thereon, and such items be admitted up to this quota without special import license. The total amount of aluminum used in this form is small, and without smelting facilities could not be converted into metallic aluminum."

With respect to potential development of atomic power in Germany, that report states.

"It is recognized that the principles of atomic energy may be known to German scientists during the period of the contemplated

tenure of these regulations, but it is believed that control of such development will be readily obtained through the rigid regulation of all construction and control of power requirements, to preclude the possibility of construction of plants for the development of such atomic energy."

To limit the war-making possibilities of the steel and steel alloys industry, the report recommends:

"1. That the productive iron and steel capacity of postwar Germany be reduced to a level sufficient only for domestic peacetime needs. Definition of this level should be the function of the United Nations Control Council and it should be subject to periodic review by the Council, with such revision as is consistent with the standard of living within Germany.

"2. That the importation of iron or iron ore, and alloys or alloy ore are to be restricted in accordance with the foregoing quota.

"3. That the importation of raw materials pertaining to the iron and steel industry, the manufacture and distribution of the finished goods, be regulated by a 'Controlled Materials Plan' such as recommended for the aluminum industry.

"4. That the re-equipment of the German steel industry be studied by steel experts of the Control Council for the purpose of eliminating such equipment which, because of its type or size, could be converted readily to the production of instruments of war.

"5. That all duties, cartel arrangements and state subsidies for steel, or goods and services into its manufacture, be prohibited."

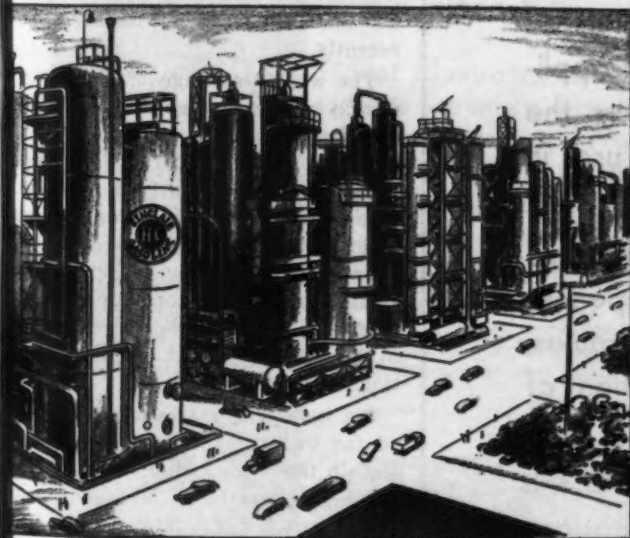
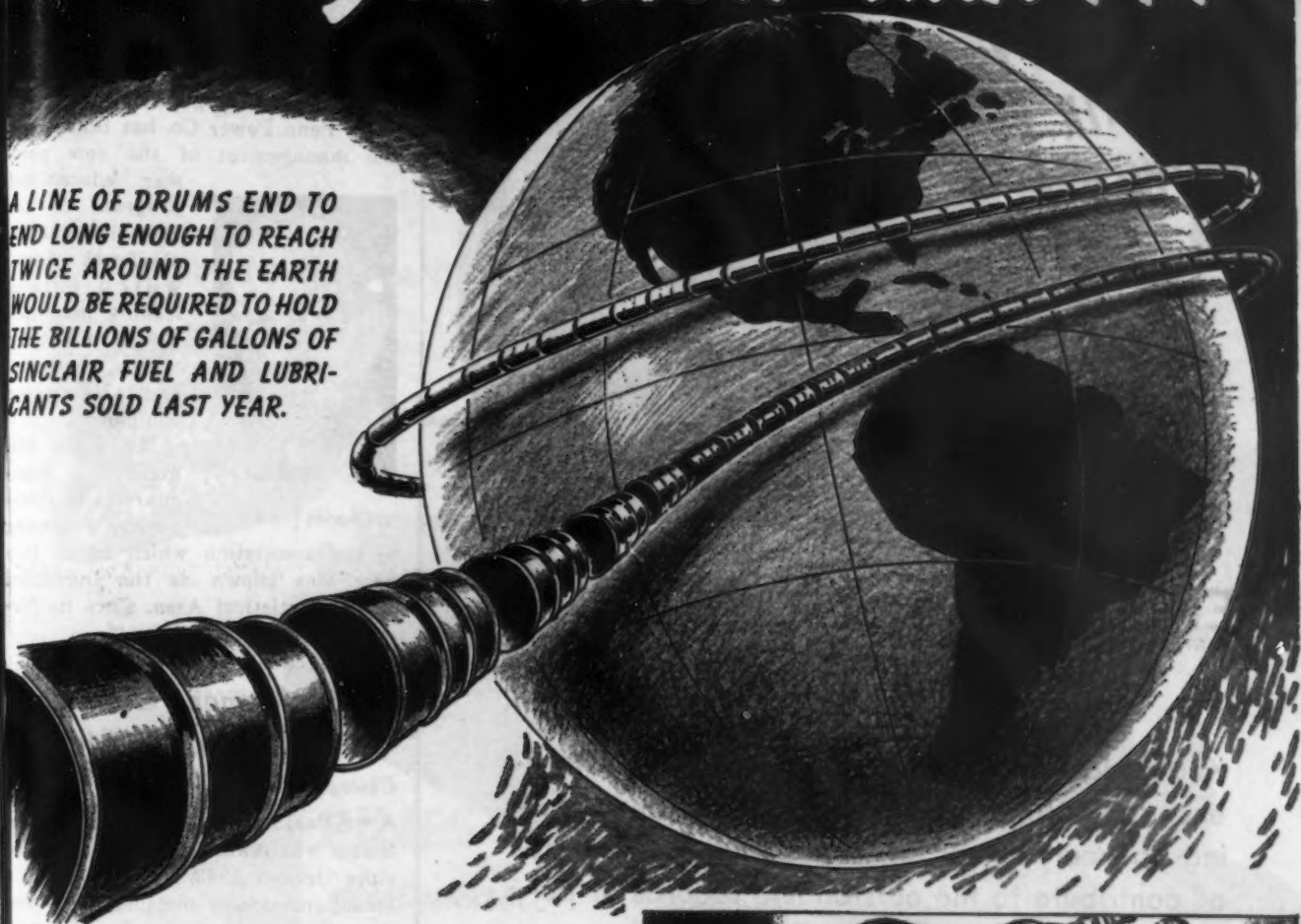
As to the regulation and control of future construction, the report says:

"Evasion of the regulations and controls herein recommended, intended for illegal production of war potential materials, would require large installations, as, for example, facilities for the production of fixed nitrogen, synthetic oil, aluminum, steel and atomic energy.

"Energy controls might be effective for the regulation of established industry, but new plants will be built, and it is therefore necessary to assure that such plants may not be convertible into war plants. Therefore, the rigid control of all new construction should be maintained through the issuance of permits by a Board of Construction Control, composed of experts in all potentials of war production."

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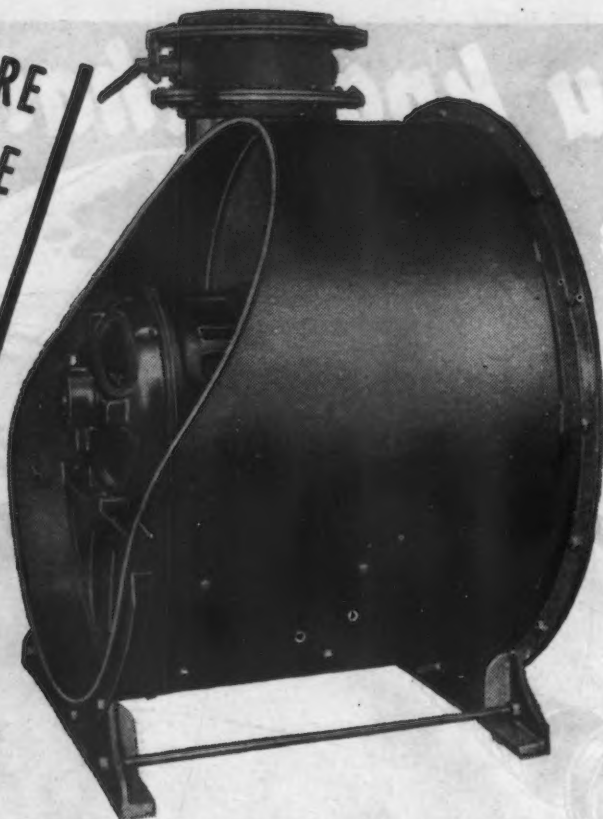
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THE IRON AGE, October 11, 1945—127

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128—THE IRON AGE, October 11, 1945

## NEWS OF INDUSTRY

### Kells Heads Electrical Industrial Truck Assn.

Pittsburgh

• • • Charles F. Kells, formerly on the industrial engineering staff of West Penn Power Co. has taken over the management of the new post-war educational program of the Electric Industrial Truck Assn., which includes leading manufacturers of battery trucks, batteries and charging equipment.



Charles F. Kells

Mr. Kells will make his headquarters in Pittsburgh, according to the association which up to this year was known as the Industrial Truck Statistical Assn. since its formation in 1925.

### Unemployment Claims Increasing Steadily

Chicago

• • • Peak employment in the United States was reached in July 1943, and since October 1943, there has been a steady increase in unemployment compensation claims, A. J. Altmeyer, chairman, Social Security Board, told the Chicago Assn. of Commerce here recently.

The weekly average of claims submitted now has reached about 1,500,000, but this does not reflect unemployment among federal government workers, maritime workers, employees in small establishments, agricultural labor and others not covered by the unemployment compensation law, he said. Layoffs are continuing at the rate of 250,000 a week, and will mount in the next few months as demobilization speeds up.

Six industrial states alone accounted for 60 pct of the nation's claims load in the week ending Sept. 15, Mr. Altmeyer declared. Michigan, with more than 228,000 total claims, carried the heaviest load. The five other states severely affected were New York, Illinois, New Jersey, California and Pennsylvania.

He specifically recommended establishment of minimum standards of unemployment compensation to eliminate wide disparities between the states; liberalization of old age and survivors insurance benefits and the

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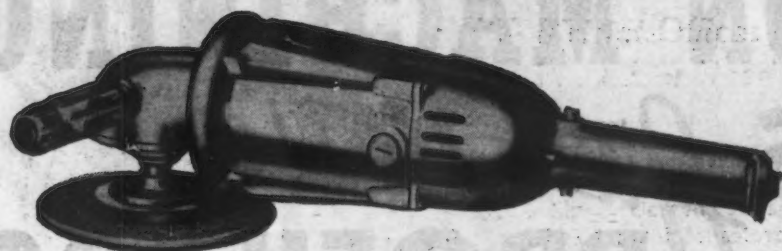
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Millers Falls Portable Electric Sanders have made many a production man say that.

It's easy to see why. They do so many *different* jobs . . . sanding, metal finishing, rubbing, paint and rust removing, stone surfacing, wire brushing . . . there's hardly any limit to their versatility.

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Three models for light, medium and heavy production operations, with a complete line of accessories that fit them to any task.

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extension of this coverage to 20,000,000 workers now excluded. Establishment of protection against sickness and disability, which he said have been the greatest single cause of poverty and dependency in the United States, were recommended. He said that this nation is the only one of the major industrial countries of the world that makes no provision to offset the loss of earnings when a worker is sick or disabled.

Intermittent unemployment will continue as a major cause of loss of earnings, the Social Security chairman said, because "under a system of free enterprise you must encourage invention, improvement, elimination of waste, variety and continual adaptation to changing ideas and circumstances. This must mean that as the processes of production and distribution change, individuals will be forced out of one employment and be obliged to seek another. This is the price, if it can be called a price, that we pay for maximum production, free enterprise and free labor."

### Special Tools Will Be Sold at Auction

Cleveland

• • • An amendment permitting the rapid sale or lease of special tools, and of particular benefit to the aircraft industry, has been issued by the Surplus Property Board to its Regulation 6, in an effort to minimize unemployment caused by the temporary closing of war plants for reconversion.

Special tools are those of such design as to have apparent value only as scrap, except in the manufacture of the particular product for which they were originally designed. Classified as special tools are dies, jigs, fixtures, gages, molds, and similar equipment.

The amendment pertains to such tools located in the contractors' plants. The order extends this to government-owned plants in the aircraft industry. Sale will be by the owning agencies rather than by the disposal agencies and will be by public auction with previously announced upset prices. Whenever no acceptable bid is received, the sale will be by negotiation.

## Tool Orders Lower; Exports in Prospect

Cleveland

• • • While a wave of strikes that promises to wash across the country has not as yet dampened even the ardor of machine tool industry's blithe spirits, orders were reported at slightly lower ebb this week.

Counteracting this, however, seems to be the prospect of foreign business being released. This week, a case occurred where the Treasury Dept. asked a builder if he would be willing to reinstate some Russian lend-lease orders stopped a long time ago, suggesting that ways are being found to get Russian former lend-lease business back on the books.


Automobile manufacturers apparently bought their machines for re-conversion quite a while ago and in the meantime, people are trying to decide what to keep of the machines they bought during the war, and consequently, for the present at least, are not buying much of anything new. In a way, this works toward the builders' advantage, since there is in the machine tool industry today a marked shortage of designing engineers, which creates a great bottleneck.

In this regard, it might be pointed out that some of the present machines on the market can be improved a great deal and these improvements can easily be a factor in rendering models of these machines, now a part of the surplus, obsolescent. However, others are as good right now as the engineers know how to make them.

Builders, as might be expected, still have a big backlog which remains almost constant at about \$38,000,000 to \$40,000,000. When this is taken care of and the plants are cleaned out along with the last residue of government contracts, there will, of course, be considerable excess capacity in the machine tool industry. Some builders have highly indefinite plans for utilizing this capacity, but going into new lines is not as easy as it sounds.

At this moment, the machine tool industry is trying to get all OPA price ceilings taken off and apparently all capital goods industry feels the same way. In this instance, ceiling simply means that certain sizes and types of machines are not being built because manufacturers won't build them at a loss and for this they can hardly be blamed. This situation becomes even more bizarre when one recalls that new tools are bought to reduce costs.

# MAMMOTH PRESS WILL TEAM UP with R-S FURNACES



Located on the horizon—the largest die forging press in the world, now in process of installation at Wyman-Gordon. When this press is completed at the end of the year, it will surpass all other presses in the world in capacity and high strength aluminum alloy forgings larger than any yet made will be available. This press will be operated by Wyman-Gordon Products Corporation, a wholly owned subsidiary of Wyman-Gordon Company Inc. the parent of Reconstruction Finance Corporation which

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## NEWS OF INDUSTRY

### WPB District Offices Closed As Need Ebbs

Cleveland

• • • Recently, six War Production Board field offices in this territory, at Akron, Canton, Youngstown, Lima, Wheeling and Johnstown, were closed. Readjustment of the WPB region, which covers Ohio, West Virginia, Kentucky and western Pennsylvania, was made in the interest of economy and efficiency due to the lessening of the work load since VJ-Day, according to Fred W. Ramsey, Regional Director.

Eight field offices and a staff of 253 employees were maintained for the time being to aid in meeting reconversion problems of industry. On the closing date 195 of WPB's present 448 workers were released.

WPB service in the districts affected by the closing of offices is being maintained through rearrangement of territory. The Cleveland office now serves the Akron-Canton-Youngstown areas. The Dayton office covers Lima, and the Pittsburgh office handles problems in the Johnstown and Wheeling areas. Other WPB offices are being continued at Columbus, Cincinnati, Charleston, Louisville and Erie.

While the reduction of war production requirements has eliminated need for many past services, Mr. Ramsey said that, in compliance with President Truman's direction to Chairman J. A. Krug, sufficient WPB organization is being maintained to aid post-war reconversion.

### Board Head Named

Washington

• • • Edward J. Dimock has been appointed Chairman of the Contract Settlement Appeal Board, succeeding Robert S. Stevens, Dean of the Cornell University Law School on leave, it was announced recently by Robert H. Hinckley, Director of Contract Settlement.

The new Appeal Board Chairman, a member of the New York Bar, has served as Reporter for the New York State Courts since January 1943. A graduate of Yale University and Harvard Law School, Mr. Dimock was a member of the New York law firm of Hawkins, Delafield and Longfellow. He is an editor of the *American Bar Association Journal*, on the faculty of the Yale Law School, and a member of the New York City, New York State, and American Bar Assns. and the American Law Institute.

# CAPEWELL

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Hartford, 2, Conn.

# CAPEWELL

## BAND SAW BLADES

## ASM Bulletin to Cover Veteran Re-employment

Cleveland

• • • Increased emphasis on employment assistance to returning veterans and ASM members dislocated by war contract cancellations will be offered by the American Society for Metals in a plan announced recently by W. H. Eisenman, national secretary.

"While the society has for some time published free classified employment advertisements in a monthly magazine, *The Metals Review*, this service to members and veterans will now be enlarged to include a monthly employment bulletin to several hundred major companies in the metal industry," Mr. Eisenman said.

"Qualifications of men available to the industry will be described in this monthly Re-employment Bulletin," Mr. Eisenman continued, "so that prospective employers may have all preliminary information on personnel available."

"Thereafter, with definite interest in specific individuals, the employer will receive, upon request, photostatic copies of complete and comprehensive qualifications and experience based on information submitted to the national office by the individual."

"If this photostatic information maintains the employer's interest," Mr. Eisenman concluded, "he may then write direct to the individual and make further and direct arrangements."

Veterans who have worked in the metal industry and ASM members dislocated by war contract cancellations who wish to use this employment service should write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio, for an employment form which may be used to submit necessary information. There is no charge for this service either to member or employer.

## Files Infringement Suit

Hammond, Ind.

• • • Linde Air Products Co., a subsidiary of Union Carbide & Carbon Corp., declares that it has filed suit in the Northern Indiana Federal District Court against Graver Tank & Mfg. Co., Chicago, and Lincoln Electric Co., Cleveland, for alleged infringement in connection with use of the unionmelt welding process.

# To Have and to Hold for the Life of the Garment . . .

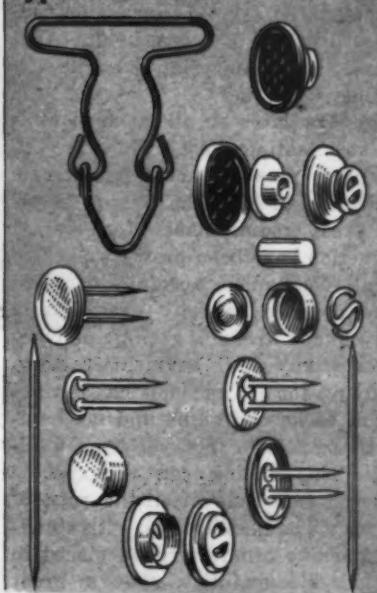


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made of  
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Special Analysis Wire  
for All Industrial  
Uses



Coppered, Tinned,  
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Galvanized

# MACHINE TOOLS

... News and Market Activities

## Unfilled Orders And New Business Still Close to War Peaks

Rockford, Ill.

• • • Backlogs and new business of many local machine tool builders are close to wartime peaks. Deliveries quoted range from 6 to 15 months. The bulk of the business on the books is from domestic industry with producers showing little enthusiasm for soliciting foreign orders. A small amount of French, Belgian and Chinese business is in evidence. Russian busi-

For additional machine tools news, see p. 106.

ness, which, predominant in last year's bookings, has nearly all been shipped, with a small amount of new buying.

Subsidiary lines, such as woodworking equipment under wartime production limitation, is occupying a larger proportion of production facilities. This is particularly true of producers of standard machine tools in relatively lighter demand than special machinery.

Demand for multiple operation special purpose automatic tools is spreading for the first time far beyond the automobile and aviation industries. This trend is accentuated by the probability of rising labor costs which can be offset only by the use of this type of machinery. Manufacturers of such varied products such as bicycles, sewing machines and electric motors have placed orders for special automatic machines, although the bulk still emanates from the automotive industry. Automobile manufacturers are placing particular reliance on this equipment as a bottleneck breaker. Longest deliveries are quoted on this type of equipment.

Standard machine tool backlogs are generally firm at from 6 to 8 months with little evidence thus far of competition from surplus equipment. Most builders are reluctant to rebuild surplus tools of their own manufacture feeling that they will be fully occupied with new business. A few manufacturers producing intricate equipment feel that they would rather overhaul old machinery of their make than to leave it in less skilled hands.

Only in the field of perishable tools

and cutters have customers' labor uncertainties been reflected on the order books. Old orders in this line have been nearly cleaned up and new business has dropped precipitously. Cancellations have been few, but shipments have been held up, and new orders withheld, noticeably, by the automotive industry. No machine tools shipments have been stopped for this reason, however.

Machine tool production is being seriously restricted by lack of skilled labor and components shortages. Most shops are manned below capacity, and lack of wartime apprentices is being

reflected. Castings constitute a major structural bottleneck causing some manufacturers to consider broader use of built-up welded construction. Welded construction is finding particular favor with builders of special machinery, although serious inroads have not yet been made.

Labor unrest among employees of machine tool builders is evident in increasing agitation for unionization. The CIO is attempting to broaden its influence in the few shops where it already is a certified bargaining agent and also is invading AFL shops and the normally non-union plants.

## Automotive Machine Tool Purchasing Seen Declining Gradually

Detroit

• • • The crest of automotive machine tool buying has past, and from now on the volume of standard equipment ordered by the automobile companies is likely to make a gradual descent.

Indications at various machine tool company offices in Detroit are that the substantial General Motors reconversion program has been pretty well completed, so far as ordering of machine tools is concerned, but that others, notably Chrysler, are still purchasing.

Delivery dates on all machine tools are very satisfactory. However, on stamping presses, the situation is about as bad as it has been. While the press requirements for limited production have been pretty well filled for all companies, orders which will make possible capacity operation in many shops are not getting delivery promises anywhere near satisfactory.

Buying for 1947 models has not yet begun, because designs and mechanical changes have not yet been finalized. This buying can be expected to begin sometime after the turn of the year. The likelihood is, with standard machine orders already placed in considerable quantity, that a great deal of this forward machine tool buying next year will revolve more and more around special machinery. An increased use of progressive machines of one type or another which combine several operations can be expected.

Machine tool buying for new transmissions is under way and will continue. Detroit Gear Division of Borg-Warner has already announced that an outlay of \$12,000,000, to tool its new transmission for Lincoln and Mercury automobiles, has begun. Chrysler also has a new transmission, but tooling plans — along with all others—are being held in obscurity. General Motors is expected to enlarge its facilities for production of Hydramatic drives for Oldsmobile and Cadillac, and if the reports that this transmission will go on Buick and Pontiac as well in the future are well founded, there will likely be still further machine tool buying on this account.

## Strikes Causing Concern

Cincinnati

• • • While the labor situation in this district is reasonably quiet, the overall effect of the national epidemic of strikes is causing concern. Although these have not affected the machinery market directly, or even indirectly, so far the comments are on the philosophical rather than the practical side. Some manufacturers seem to see possibility of the present strikes leading to a sharp change in the economic structure of the country. In fact, a comment that the situation may lead to a small revolution is heard. Business, however, is reported to be good and some manufacturers have orders supporting activity for a period up to five years. This latter, however, is mentioned with a big "if" depending upon the outcome of the strike situation.

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THE IRON AGE, October 11, 1945—135

# NONFERROUS METALS

... News and Market Activities

## Premium Plan Said To Stabilize Copper Mart

Washington

• • • Stockpiles of refined copper are expected to average four months' supply during the fourth quarter, according to WPB sources.

Copper mining will continue at the current level of output, these sources say, unless government subsidies under the Premium Price Quota Plan are discontinued. Such withdrawal, it is pointed out, would have the effect of depressing the market level to a considerable extent. Smelter activity, however, may not keep pace with mine output since production of refined copper is more closely tied in with the demand for finished products.

Due to diminished military requirements, monthly output of brass and wire mills may drop to around 325 million lb compared with 540 million lb during June and the peak of 700 million lb in March 1945. A sharp decrease in monthly production of brass mill products is predicted during the fourth quarter—from the June total of 350 million lb to around 150 million lb.

## Canadian Nonferrous Producers Optimistic

Toronto

• • • Brighter outlook has developed in the Canadian copper market and producers are convinced that they will have no difficulty in disposing of the greater part of output over the next six months. Production to the end of this year already has been sold. The change from wartime to peacetime use of copper caused some concern a few months ago when British government contracts were canceled and Canadian producers had to depend on the United States and domestic markets as outlets. However, British copper reserves have been sharply reduced in recent months and it is expected that heavy buying from that country again will develop on a broad scale in the near future. Following the cancellation of British contracts several months ago there was expansion in demand from the United States but the latter contracts extend only to the end of October.

Canadian producers have made plans for expanding lead and zinc production in the final months of this year but there is a possibility that this program may be delayed owing to labor shortage. Lead and zinc sales to Britain were suspended in August and it is not expected that the United Kingdom will be in the market for any large tonnages until present stocks have been cleaned up.

## Aluminum Scrap Floor Prices Set Up by SPA

Washington

• • • Minimum prices at which aluminum scrap may be sold out of contractor inventories by owning and disposal agencies have been announced by the Surplus Property Administration.

Contained in SPA Regulation 12, these prices do not apply to sales outside the continental United States, to sales of aluminum borings and turnings, where amounts to be sold amount to 10,000 lb or less, nor to sales or retentions otherwise provided for in SPA regulations.

Pig or ingot resulting from melting of obsolete or wrecked aircraft—6¢.

Segregated solids (plant or production scrap or any other solids consisting of only one alloy and so identified); pure cable (clean and free of iron); foil (clean and new)—6¢.

Mixed solids (plant or production scrap consisting of an unknown alloy or consisting of more than one alloy; obsolete castings and forgings (alloy unknown or not segregated); obsolete pistons (alloy unknown or not segregated); any other clean solids free of all metal other than aluminum—5¢.

Solids mixed with foreign materials (any scrap, other than as defined below, which is contaminated by or mixed with foreign materials—4¢.

Prepared aircraft scrap (not including engines or engine parts) recovered from wrecked, crashed, obsolete, or uncompleted airframes cut or sheared into pieces approximately 48 in. x 60 in. x 24 in. or less and shipped in 30,000 lb minimum cars—2½¢.

Wrecked, crashed, obsolete or uncompleted airframes to be scrapped (without preparation of any kind)—1¼¢.

## Milk Can Tin Quotas Based on Prewar Use

Washington

• • • Bringing reconversion uses more closely in line with peacetime operations, WPB has announced that tin quotas for fluid milk shipping containers will now be calculated on a prewar base period in place of the 1944 base period.

Designed to allow manufacturers of milk shipping containers who have been engaged in war work to reenter their former field, WPB issued Direction 3 to the tin order, M-43. Under this directive quota allowances for these containers up to July 1, 1946, will be the amount proportional to the applicant's average use of pig tin in the 1938-1941 period, inclusive, less the amount used in the third quarter of 1945.

Manufacturers of brass mill products will also have their tin quotas readjusted through the issuance of Directive 4 of the tin order. This direction states the exact amount of pig tin which may be used by a specified list of 21 manufacturers of brass mill products during the July 1, 1945-Dec. 31, 1945, period. Quantities of tin already used by any of these manufacturers must be deducted from the total six months allocation in figuring allowable uses for the remainder of the year.

## Copper Market Quiet

New York

• • • Copper producers report that the market is very quiet at the moment, probably largely due to the effect of strikes in cutting back or delaying orders to fabricators. It is expected that should the strikes be resolved, orders will be placed for November delivery in volume.

In any event it is not likely that the strikes will affect the supply-demand balance since the excess of copper over current requirements will be added to the stockpile, and consumer demand may be expected to be merely held in abeyance until the end of the strike.

### Primary Metals

(Cents per lb., unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb.)	15.00
Aluminum pig	14.00
Antimony, American, Laredo, Tex.	14.00
Beryllium copper, 2.75-4.25% Be; dollars per lb. contained Be	\$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb.)	\$1.50 to \$1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$90 to \$100
Lead, St. Louis	4.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	37.50
Mercury, dollars per 76-lb. flask	
L.o.b. New York	\$.92 to \$.95
Nickel, electro	45.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per oz.	\$15.00
Silver, New York, cents per oz.	\$71.11
Lm. Straits, New York	62.00
Zinc, East St. Louis	3.35
Zinc, New York	3.65

### Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2) 9.00 to 10.00	
Aluminum, deoxidizing	
No. 2, 3, 4	\$6.00 to 9.50
Brass Ingot	
85-5-5-5 (No. 115)	12.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

### Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.27	20.37	
Copper, H.R.		17.37	
Copper drawn		18.37	
Low brass, 80%		20.40	20.15
High brass			19.48
Red brass, 85%		20.61	20.36
Naval brass	20.37	19.13	24.50
Brass, free cut		15.01	
Commercial bronze, 90%	21.22	21.07	
Commercial bronze, 85%		21.53	21.28
Manganese bronze	24.00		25.00
Phos. bronze, A, B, 5%		26.50	26.25
Muntz metal	20.12	18.87	22.75
Everdur Herculoy, Olympic or equal		25.50	26.00
Nickel silver, 5%		28.75	26.50
Architect bronze	19.13		

### Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (1/2 H); 52S, 61c. (O); 24S, 67 1/2c. (T).	
Plate: 0.250 in. and heavier: 2S and 2S, 21.2c.; 52S, 24.2c.; 61S, 22.5c.; 24S, 24.2c.	
Flat Sheet: 0.125 in. thickness: 2S and 2S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.	

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

**Extruded Shapes:** "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 15c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 52S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 1/2c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

**Wire Rod and Bar:** Base price: 178T and 118T-3, screw machine stock. Rounds: 1/4 in., 28 1/2c. per lb.; 1/2 in., 18c.; 1 in., 24 1/2c.; 2 in., 23c. Hexagonals: 1/4 in., 34 1/2c. per lb.; 1/2 in., 28 1/2c.; 1 in., 25 1/2c.; 2 in., 25 1/2c. 2S, as fabricated, random or standard lengths, 1/4 in., 24c. per lb.; 1/2 in., 25c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths, 0.093-0.187 in. thick by 1.001-2.000 in. wide, 23c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 23c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2c.

### NONFERROUS SCRAP METAL QUOTATIONS

(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

#### Copper, Copper Base Alloys

##### OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper turnings	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	6.10*

##### OPA Group 2

Bell metal	15.50
High grade bronze gears	12.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	12.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	8.00
Gliding metal turnings	8.50
Contaminated glided metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids borings	4.25
Yellow brass castings	6.00
Automobile radiators	7.25
Zincy bronze borings	7.00
Zincy bronze solids	7.00

##### OPA Group 3

Fired rifle shells	8.00
Brass pipe	7.25
Old rolled brass	6.75
Admiralty condenser tubes	7.25
Muntz metal condenser tubes	6.75
Plated brass sheet, pipe reflectors	6.25
Manganese bronze solids	7.00†
Manganese bronze solids	6.00*
Manganese bronze borings	6.25†

##### OPA Group 4

Refinery brass	4.50*
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\*Price varies with analysis. †Lead content 0.00 to 0.40 per cent. ‡Lead content 0.41 to 1.00 per cent.

### Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 56c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 60c.

#### Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.50
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.275

### Aluminum\*

<b>Plant scrap, segregated</b>	
2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S	
25S	4.00
turnings, dry basis	3.00
Low copper alloys 61, 62, 61, 62S	
solids	7.25
turnings, dry basis	6.75

<b>Plant scrap, mixed</b>	
Solids	4.00
Turnings, dry basis	3.75

<b>Obsolete scrap</b>	
Pure cable	3.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	5.00

### Magnesium\*

<b>Segregated plant scrap</b>	
Pure solids and all other solids, exempt	
Borings and turnings	1.50

<b>Mixed, contaminated plant scrap</b>	
Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	3.00
Grade 2 borings and turnings	1.00

\*Nominal.

### Zinc

New zinc clippings, trimmings	6.00
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unwaxed zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.40
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

### Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

### Nickel

Ni content 98+%, Cu under 1/4%, 25c. per lb.; 90 to 98% Ni, 25c. per lb. contained Ni.

### ELECTROPLATING ANODES AND CHEMICALS

#### Anodes

(Cents per lb., f.o.b. shipping point in 500 lb. lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25 1/2
Electrodeposited	18 1/2
Rolled, oval, straight	19 1/2
Curved	20 1/2
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	33 1/2
Zinc, cast, 99.99, 15 in. or longer	16 1/2
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver 999 fine	
Rolled, 100 oz. lots, per oz.	80

#### Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	24.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver cyanide, 100 oz. lots, per oz.	0.6083
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	22.00
Zinc sulphate, 39 per cent, crystals, bbls., frt. allowed	6.25

## Scrap Market Holds Firm in Coal Tieups

### New York

• • • There are very few modifications of price in the market this week, and those confined largely to Chicago where turnings and borings have increased to ceilings and rail specialties have been subject to slight downward readjustment.

The effect of coal strikes on the steel industry has served to lessen interest in the maintenance of scrap

*For additional scrap news see p. 107.*

supplies. Nevertheless, this lack of interest has failed to produce any significant trend in market quotations.

There is some evidence that unprepared scrap is more freely available at the present time than for many months past. Moreover, there is an incipient trend noticeable in some sections of the country for scrap labor to return to the yards.

From Detroit comes news of the entry into the market of a large consumer of heavy melting and plate scrap, and an indication that all local consumers are buying.

**PITTSBURGH** — The scrap market here is in a rather confused state, in that dealers claim that scrap is very difficult to obtain and, while demand is not anyway near its wartime peak, it is strong enough to keep dealers worrying about how to fill orders. Railroad scrap is not moving as fast as normally, but this is laid generally to a lack of manpower needed for collection. Prices are strong, with as much as the full \$1.00 springboard being offered. There is very little, if any, long haul scrap coming into the district. The coal strike further muddies the scrap market waters in that, at this point, scrap demand increases because of the strike, but if prolonged demand will slough off rapidly as mills go completely down.

**CHICAGO**—Impetus of the coal strike has reacted on an already tight market to keep all openhearth grades strong at ceiling and to push to ceiling previously weak blast furnace grades. In order to conserve coke, scrap ratios in blast furnace charges have been stepped up, and purchases made of all blast furnace grades at ceiling. Supply of openhearth grades is tighter than at any time this year. Only railroad specialties show weakness, falling to command full premiums.

**PHILADELPHIA**—Several of the mills here that stopped shipments temporarily have removed their bans. Prepared scrap is still none too plentiful because of the

difficulty in obtaining scrap yard labor. Turnings remain scarce while demand for this grade and for cast iron is very strong. In general, however, purchases are mainly on a hand to mouth basis.

**DETROIT**—Entry of the second largest local consumer into the market for heavy melting and plate scrap last week-end tightened the local picture and cemented prices more firmly at this time at ceiling. All Detroit scrap users are now purchasing, and with supply limited there is no hint of weakening of prices at any point in the list, even though some blast furnace grades are moving locally slightly below the top prices. However, good quality tonnage continues to command the maximum prices in Detroit and for Valley points, as it has in the recent past.

**BOSTON**—Borings and turnings sentiment is strengthening because production has fallen off and fewer are coming out against old contracts. Consumers may have overstayed a buying market, at least the failure of prices to break suggests eastern Pennsylvania mills are bidding for and buying heavy steel in a modest way, paying ceilings, while demand for low phos plate and cast is keen. Supplies of the latter are so skimpy, foundries would pay a premium if government permitted.

**NEW YORK**—While all scrap grades are reported to continue firmly at ceilings here, it is said that there is some lessening of interest on the part of mills in the question of scrap due to the effect of the coal strikes which have seriously hampered operations. Labor is apparently slowly beginning to enter the scrap industry here although as yet the change in trend could not be called significant. Nevertheless it is apparent that there are blocks of unprepared scrap entering the market which are going at low prices caused by lack of interest on the part of bidders.

**BUFFALO**—Low production of industrial scrap during the reconversion period, plus the fact that a Pittsburgh district mill has been getting the lion's share of railroad items, kept the local market smack at ceiling this week. The leading consumer placed orders for 10,000 tons of No. 1 and No. 2 melting and hydraulic bundles at the maximum, but without springboards. Yard operators report more employees are returning from the armed forces although still not in sufficient numbers to provide prewar efficiency in preparation of material.

**CLEVELAND**—All grades continue to bring ceiling prices here in a market where there is much ado about a little scrap. Some quarters report that the scarcity is giving cause for worry and that some of the consumers are becoming

more insistent. But with the coal strike going full blast and the enforced saving grace of low operating rates temporarily, the mills are making out. One major consumer here bought low phos for the openhearth and reports of similar purchases in other districts seem to preclude the possibility that local supplies of this grade can be readily augmented. Brokers say that only one car is coming in now where three did formerly, although limited amounts of all grades are coming through. Recent railroad lists had little in comparison with former offerings, and the railroads are reported hard put for labor to prepare scrap, a good deal of which is on their hands unprepared.

**CINCINNATI**—The scrap market in this area continues to be quiet. There is a total absence of any tonnage buying with two of the leading purchasers in the area out of the market except for shipments on old commitments. Prices appear to be still holding at about the ceiling, although some pressure has been indicated on specialty items. Inventories of consumers appear to be adequate under present demand but dealers' stocks are not large, mainly due to manpower shortage.

**BIRMINGHAM** — Openhearth steel scrap now is being accepted in this market at ceiling prices with \$1 per ton freight equalization. For the past few months freight equalization had not been allowed. Following recent purchases of contract termination shell scrap by foundries and electric furnace operators, there is little demand for electric furnace and foundry grades. The market remains strong for blast furnace material.

**SAN FRANCISCO**—Substantial maritime shipyard surpluses resulting from liquidation and termination of contracts have provided abundant scrap cushions throughout the Pacific Coast for the past several weeks, resulting in lower market quotations ranging from \$3.50 at Seattle to \$1.00 in the San Francisco Bay area on standard melting grades. A principal purchaser in the Pacific Northwest recently bought 25,000 tons of maritime shipyard scrap at Tacoma, unprepared, for \$5.10 per gross ton. At Wilmington, Calif., 40,000 tons of shipyard scrap brought out bids ranging from approximately \$8.50 to \$12.00 per gross ton unprepared. Even at these low prices, no midwest bidders appeared in the market and there has been no recent movement of West Coast scrap eastward. Buyers and dealers feel that there are ample quantities of both prepared and unprepared scrap for predictable mill needs within the coming six months' period and there is little prospect of firmer prices for some time to come. Because of the character of shipyard scrap requiring a minimum of sorting and preparation, labor is available to make the material suitable for mills and furnaces.

# IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

## PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	\$14.50 to 15.00
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

## CHICAGO

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovel. turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge.	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Rails 3 ft. and under	22.25*
Locomotive tires, cut	33.25 to 35.25
Cut bolsters & side frames	20.25 to 22.25
Angles & splice bars	22.25*
Standard stl. car axles	24.00 to 24.50
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

## CINCINNATI

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	\$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

## BOSTON

Dealers' buying prices per gross ton, f.a.b. cars

No. 1 hvy. melting	\$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovellings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
C'n cast. chem. bor.	13.06 to 14.15*
Truck delivery to foundry	
Machinery cast.	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

## DETROIT

Per gross ton, brokers' buying prices:	
No. 1 hvy. melting	\$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.32*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast	20.00*

## PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	13.50 to 14.00
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

## ST. LOUIS

Per gross ton delivered to consumer:	
Heavy melting	\$17.50*
Bundled sheets	17.50*
Mach. shop turn.	\$9.00 to 9.50
Locomotive tires, uncut	18.00*
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	21.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ry cast	20.00*
Breakable cast	16.50*

## BIRMINGHAM

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	\$9.50 to 10.00
Cast iron borings	11.00 to 11.50
Bar crops and plate	17.50 to 18.00
Structural and plate	17.50 to 18.00
No. 1 cast	20.00*
Stove plate	17.00*
Steel axles	18.00*
Scrap rails	18.50*
Rerolling rails	20.50*
Angles & splice bars	18.50 to 19.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	16.50 to 17.00

## YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

## NEW YORK

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	15.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast.	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Stove plate	19.00*
Clean auto cast.	20.00*
Unstrip. motor blks.	17.50*
C'n chem. cast bor.	14.33*

## BUFFALO

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	16.25*
Mixed bor. & turn.	14.25*
No. 1 cupola cast.	20.00*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

## CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

## SAN FRANCISCO

Per gross ton delivered to consumer:	
RR. hvy. melting	\$15.50 to \$16.25
No. 1 hvy. melting	15.50 to 16.25
No. 2 hvy. melting	14.50 to 15.25
No. 2 bales	13.00 to 13.75
No. 3 bales	9.50 to 10.25
Mach. shop turn.	7.00
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

## LOS ANGELES

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$13.00 to \$14.00
No. 2 hvy. melting	12.00 to 13.00
No. 2 bales	11.00 to 12.00
No. 3 bales	9.00
Mach. shop turn.	4.00
No. 1 cupola cast.	19.00 to 21.00

## SEATTLE

Per gross ton delivered to consumer:	
RR. hvy. melting	\$10.00
No. 1 & No. 2 hvy. melt.	10.00
Elec. furn. 1 ft. und.	\$14.00 to 15.00
No. 1 cupola cast.	20.00*

# Comparison of Prices . .

Advances over past week in Heavy Type declines in Italics. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel:	Oct. 9,	Oct. 2,	Sept. 4,	Oct. 10,
(cents per pound)	1945	1945	1945	1944
Hot-rolled sheets	2.20	2.20	2.20	2.10
Cold-rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.70	3.70	3.70	3.50
Hot-rolled strip	2.10	2.10	2.10	2.10
Cold-rolled strip	2.80	2.80	2.80	2.80
Plates	2.25	2.25	2.25	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terneplate:	Oct. 9,	Oct. 2,	Sept. 4,	Oct. 10,
(dollars per base box)	1945	1945	1945	1944
Tinplate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tinplate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes:	Oct. 9,	Oct. 2,	Sept. 4,	Oct. 10,
(cents per pound)	1945	1945	1945	1944
Merchant bars	2.25	2.25	2.25	2.15
Cold-finished bars	2.75	2.75	2.75	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40

Wire and Wire Products:	Oct. 9,	Oct. 2,	Sept. 4,	Oct. 10,
(cents per pound)	1945	1945	1945	1944
Bright wire	2.75	2.75	2.75	2.60
Wire nails	2.90	2.90	2.90	2.55

Rails:	Oct. 9,	Oct. 2,	Sept. 4,	Oct. 10,
(dollars per gross ton)	1945	1945	1945	1944
Heavy rails	\$43.00	\$43.00	\$43.00	\$40.00
Light rails	45.00	45.00	45.00	40.00

Semifinished Steel:	Oct. 9,	Oct. 2,	Sept. 4,	Oct. 10,
(dollars per gross ton)	1945	1945	1945	1944
Rerolling billets	\$36.00	\$36.00	\$36.00	\$34.00
Sheet bars	36.00	36.00	36.00	34.00
Slabs, rerolling	36.00	36.00	36.00	34.00
Forging billets	42.00	42.00	42.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp:	Oct. 9,	Oct. 2,	Sept. 4,	Oct. 10,
(cents per pound)	1945	1945	1945	1944
Wire rods	2.15	2.15	2.15	2.00
Skelp	1.90	1.90	1.90	1.90

Pig Iron:	Oct. 9,	Oct. 2,	Sept. 4,	Oct. 10,
(per gross ton)	1945	1945	1945	1944
No. 2 foundry, Phila.	\$26.84	\$26.84	\$26.84	\$25.84
No. 2, Valley furnace	25.00	25.00	25.00	24.00
No. 2, Southern, Cin'ti.	25.44	25.44	25.44	24.44
No. 2, Birmingham	21.38	21.38	21.38	20.38
No. 2 foundry, Chicago†	25.00	25.00	25.00	24.00
Basic, del'd eastern Pa.	26.34	26.34	26.34	25.34
Basic, Valley furnace	24.50	24.50	24.50	23.50
Malleable, Chicago†	25.00	25.00	25.00	24.00
Malleable, Valley	25.00	25.00	25.00	24.00
L. S. charcoal, Chicago..	42.34	42.34	42.34	37.34
Ferromanganese†	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.  
† For carlots at seaboard.

Scrap:	Oct. 9,	Oct. 2,	Sept. 4,	Oct. 10,
(per gross ton)	1945	1945	1945	1944
Heavy melt'g steel, P'gh	\$20.00	\$20.00	\$20.00	\$16.25
Heavy melt'g steel, Phila.	18.75	18.75	18.75	14.50
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	17.50
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	11.75
Low phos. plate, Youngs'n	22.50	22.50	22.50	18.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia..	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke, Connellsville:	Oct. 9,	Oct. 2,	Sept. 4,	Oct. 10,
(per net ton at oven)	1945	1945	1945	1944
Furnace coke, prompt...	\$7.50	\$7.50	\$7.50	\$7.00
Foundry coke, prompt...	9.00	9.00	9.00	8.25

Nonferrous Metals:	Oct. 9,	Oct. 2,	Sept. 4,	Oct. 10,
(cents per pound to large buyers)	1945	1945	1945	1944
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin, Straits, New York..	52.00	52.00	52.00	52.00
Zinc, East St. Louis....	8.25	8.25	8.25	8.25
Lead, St. Louis.....	6.35	6.35	6.35	6.35
Aluminum, virgin, del'd..	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex..	14.50	14.50	14.50	14.50

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943 issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

# Composite Prices . .

FINISHED STEEL				PIG IRON		SCRAP STEEL	
Oct. 9, 1945	2.42471¢ per lb.	.....	.....	\$24.61 per gross ton	.....	\$19.17 per gross ton	.....
One week ago	2.42471¢ per lb.	.....	.....	\$24.61 per gross ton	.....	\$19.17 per gross ton	.....
One month ago	2.41571¢ per lb.	.....	.....	\$24.61 per gross ton	.....	\$19.17 per gross ton	.....
One year ago	2.21189¢ per lb.	.....	.....	\$23.61 per gross ton	.....	\$16.08 per gross ton	.....
HIGH				HIGH		HIGH	
1945	2.42471¢ July 3	2.21189¢ Jan. 2	.....	\$24.61 Feb. 20	\$23.61 Jan. 2	\$19.17	\$19.17
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	.....	\$23.61	\$23.61	19.17	\$15.67 Oct. 24
1943	2.25513¢	2.25513¢	.....	23.61	23.61	19.17	\$19.17
1942	2.26190¢	2.26190¢	.....	23.61	23.61	19.17	\$19.17
1941	2.43078¢	2.43078¢	.....	\$23.61 Mar. 20	\$23.45 Jan. 2	\$22.00 Jan. 7	\$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	.....	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	.....	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	.....	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	.....	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 8
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	.....	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 9
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	.....	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	.....	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	.....	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	.....	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	.....	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	.....	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	.....	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941 issue.

Based on averages for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.



## NO LOITERING IN AISLES

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### ELECTRIC OVERHEAD CRANES

4401 West National Avenue,  
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# ... Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per pound unless otherwise indicated. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. For price exceptions to finished and semi-finished steels turn several pages.

Basing Points													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleveland	Birm- ingham	Buffalo	Young- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
<b>SHEETS</b>															
Hot-rolled	2 20¢	2 20¢	2 20¢	2 20¢	2 20¢	2 20¢	2 20¢	2 20¢	2 30¢	2 20¢		2 75¢	2 30¢	2 44¢	2 37¢
Cold-rolled <sup>1</sup>	3 05¢	3 05¢	3 05¢	3 05¢		3 05¢	3 05¢		3 15¢	3 05¢		3 70¢	3 15¢	3 39¢	3 37¢
Galvanized (24 gage)	3 70¢	3 70¢	3 70¢		3 70¢	3 70¢	3 70¢	3 70¢	3 80¢	3 70¢		4 25¢		3 94¢	3 87¢
Roaming (20 gage)	3 45¢	3 45¢	3 45¢	3 45¢			3 45¢		3 55¢	3 45¢		4 10¢	3 55¢	3 81¢	3 77¢
Long term <sup>2</sup>	3 40¢	3 40¢	3 40¢									4 55¢		4 16¢	4 12¢
<b>STRIP</b>															
Hot-rolled <sup>3</sup>	2 10¢	2 10¢	2 10¢	2 10¢	2 10¢		2 10¢			2 10¢		2 75¢	2 20¢	2 46¢	
Cold-rolled <sup>4</sup>	2 80¢	2 80¢		2 80¢			2 80¢		(Worcester=3.00¢)				2 90¢	3 16¢	
Cooperage stock	2 20¢	2 20¢			2 20¢		2 20¢							2 56¢	
Commodity cold-rolled	2 05¢	3 05¢		2 95¢			2 95¢		(Worcester=3.25¢)				3 05¢	3 31¢	
<b>TINPLATE</b>															
Standard coles, base box	\$5 00	\$5 00	\$5 00						\$5 10					5 26¢	5 32¢
Electro, box	10 25 lb 10 50 lb 10 75 lb	\$4 35 \$4 50 \$4 65	\$4 35 \$4 50 \$4 65	\$4 35 \$4 50 \$4 65					\$4 60 \$4 75						
<b>BLACKPLATE</b>															
29 gage <sup>5</sup>	3 05¢	3 05¢	3 05¢						3 15¢			4 05¢ <sup>11</sup>			3 37¢
<b>TERMES, MFG.</b>															
Special coated, base box	\$4 30	\$4 30	\$4 30						\$4 40						
<b>BAR</b>															
Carbon steel	2 25¢	2 25¢	2 25¢	2 25¢	2 25¢	2 25¢			(Duluth=2.35¢)		2 60¢	2 90¢	2 35¢	2 59¢	2 57¢
Rail steel <sup>6</sup>	2 25¢	2 25¢	2 25¢	2 25¢	2 25¢	2 25¢					2 60¢	2 90¢			
Reinforcing (billets) <sup>7</sup>	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢			2 60¢	2 55¢	2 25¢	2 39¢	
Reinforcing (rail) <sup>7</sup>	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢	2 15¢			2 50¢	2 55¢	2 25¢		2 47¢
Cold-finished <sup>8</sup>	2 75¢	2 75¢	2 75¢	2 75¢		2 75¢			(Detroit=2.50¢)	(Toledo=2.90¢)			3 09¢	3 07¢	
Alloy, hot-rolled	2 70¢	2 70¢				2 70¢			(Bethlehem, Massillon, Canton=2.70¢)				3 80¢		
Alloy, cold-rolled	3 35¢	3 35¢	3 35¢	3 35¢		3 35¢							3 45¢		
<b>PLATES</b>															
Carbon steel <sup>12</sup>	2 25¢	2 25¢	2 25¢	2 25¢	2 25¢		2 25¢	2 25¢	(Cantonville and Claymont=2.25¢)		2 60¢	2 80¢	2 47¢	2 44¢	2 30¢
Floor plates	3 50¢	3 50¢									3 85¢	4 15¢		3 88¢	3 83¢
Alloy	3 50¢	3 50¢							(Cantonville=2.50¢)		3 95¢	4 15¢		3 79¢	3 80¢
<b>SHAPES</b>															
Structural	2 10¢	2 10¢	2 10¢		2 10¢	2 10¢			(Bethlehem=2.10¢)		2 45¢	2 75¢		2 37¢	2 21¢
<b>SPRING STEEL, C-R</b>															
0.25 to 0.50 carbon	2 80¢			2 80¢					(Worcester=3.00¢)						
0.51 to 0.75 carbon	4 30¢			4 30¢					(Worcester=4.50¢)						
0.76 to 1.00 carbon	6 15¢			6 15¢					(Worcester=6.35¢)						
1.01 to 1.25 carbon	8 35¢			8 35¢					(Worcester=8.55¢)						
<b>WIRE<sup>9</sup></b>															
Bright <sup>10</sup>	2 75¢	2 75¢		2 75¢	2 75¢				(Worcester=2.85¢)	(Duluth=2.80¢)		3 25¢			3 07¢
Galvanized															
Spring (high carbon)	3 35¢	3 35¢		3 35¢					(Worcester=3.45¢)			3 85¢			3 47¢
<b>PIPING</b>															
Steel sheet	2 40¢	2 40¢				2 40¢						2 95¢			2 73¢

## SEMI-FINISHED STEEL

**Ingot, Carbon, Re-rolling**  
Base per gross ton, f.o.b. mill.... \$31.00

**Ingot, Carbon, Forging**  
Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown ..... \$36.00

**Ingot, Alloy**  
Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh ..... \$45.00

## Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3.00 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$12.00 higher. Provo, \$11.20 higher. Delivered prices do not reflect 3 pct tax on freight rates.

Per Gross Ton  
Rerolling ..... \$36.00  
Forging ..... 42.00

## Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem, per gross ton ..... \$54.00  
Price delivered Detroit \$2.00 higher; East Michigan, \$3.00 higher.

## Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

Per Gross Ton  
Openhearth or bessemer ..... \$36.00

## PRICES

### Skelp

Pittsburgh, Chicago, Youngstown,  
Coatesville, Pa., Sparrows Point, Md.

Grooved, universal and sheared .. 1.90c.  
Per Lb.

### Wire Rods

(No. 5 to 9/32 in.)

Per Lb.  
Pittsburgh, Chicago, Cleveland... 2.15c.  
Worcester, Mass. .... 2.35c.  
Birmingham .... 2.15c.  
San Francisco .... 2.65c.  
Galveston .... 2.40c.  
9/32 in. to 47/64 in., 0.15c. a lb. higher.  
Quantity extras apply.

### Shell Steel

Per Gross Ton  
3 in. to 12 in. .... \$52.00  
12 in. to 18 in. .... 54.00  
18 in. and over .... 56.00  
Basic open hearth shell steel, f.o.b.  
Pittsburgh, Chicago, Buffalo, Gary, Cleveland,  
Youngstown and Birmingham.  
Prices delivered Detroit are \$2.00  
higher, East Michigan, \$3 higher.  
Price Exceptions: Follansbee Steel  
Corp. permitted to sell at \$13.00 per gross  
ton, f.o.b. Toronto, Ohio, above base  
price of \$52.00.  
Note: The above base prices apply on  
lots of 1000 tons of a size and section to  
which are to be added extras for chemical  
requirements, cutting, or quantity.

## RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb.,  
No. 1 O.H., gross ton .... \$43.00  
Angle splice bars, 100 lb. .... 2.70  
(F.o.b. Basing Points) Per Gross Ton  
Light rails (from billets) .... \$45.00  
Light rails (from rail steel) .... 44.00  
Base per Lb.  
Cut spikes .... 2.35c.  
Screw spikes .... 5.40c.  
Tie plate, steel .... 2.30c.  
Tie plates, Pacific Coast .... 2.45c.  
Track bolts .... 4.75c.  
Track bolts, heat treated, to rail-  
roads .... 5.00c.  
Track bolts, jobbers discount .... 63-5  
Basing points, light rails, Pittsburgh,  
Chicago, Birmingham; cut spikes and tie  
plates—Pittsburgh, Chicago, Portsmouth,  
Ohio, Weirton, W. Va., St. Louis, Kansas  
City, Minnequa, Colo., Birmingham and  
Pacific Coast ports; tie plates alone—  
Steelton, Pa., Buffalo, Cut spikes alone—  
Youngstown, Lebanon, Pa., Richmond,  
Oregon and Washington ports, add 35c.

## TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse,  
Also Canton, O.) Base per lb.

High speed .... 67c.  
Straight molybdenum .... 54c.  
Tungsten-molybdenum .... 57 1/2c.  
High-carbon-chromium\* .... 43c.  
Oil hardening\* .... 24c.  
Special carbon\* .... 22c.  
Extra carbon\* .... 18c.  
Regular carbon\* .... 14c.

Warehouse prices east of Mississippi  
are 2c. a lb. higher; west of Mississippi  
3c. higher.

## WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago,  
Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points
Base per Keg		
Standard wire nails....	\$2.90	\$3.40
Coated nails ..	2.90	3.40
Cut nails, carloads ...	3.85	...
Base per 100 Lb.		
Annealed fence wire...	\$3.05	\$3.55
Annealed galv. fence wire	3.40	3.90
Base Column		
Woven wire fence* ....	67	86
Fence posts, carloads..	69	86
Single loop bale ties ..	66	91
Galvanized barbed wire**	73	83
Twisted barbed wire...	73	...

\*15 1/2 gage and heavier. \*\*On 30-rod  
spools in carload quantities.  
†Prices subject to switching or trans-  
portation charges.

MILL LENGTH RODS  
IN STOCK FOR  
IMMEDIATE DELIVERY

## Ampcoloy

continuous cast rods and  
tubes of bearing bronze

*Cut Costs  
4 ways!*

Because the continuous casting process results in  
rods and tubes of close tolerance and soundness  
and gives you a fine, even dispersal of lead and  
other secondary constituents, you benefit through  
four important production economies. (1) Your  
scrap loss due to metal faults is practically elimi-  
nated. (2) Your tools last longer because of a  
sand-free surface and no internal segregation. (3)  
You get faster production on screw machines, with  
big savings in time, manpower, and money. (4)  
You get further savings due to the relatively small  
amount of handling and storing scrap accumulation.

If the successful operation of your product de-  
pends on bronze with excellent bearing character-  
istics, your good judgment will tell you to investi-  
gate the merits and economies of Ampcoloy con-  
tinuous cast rods and tubes of bearing bronze.

The sale of continuous cast products as applied  
to forms to be machined or used "as cast" is ex-  
clusive with Ampco. Available in a variety of alloys.  
Write for data sheet 131 showing photomicrographs  
and properties. Ampco Metal, Inc., Dept. 1A-10,  
Milwaukee 4, Wisconsin. Ampco Field Offices in  
Principal Cities.



Ampcoloy is a product of  
Ampco Metal, Inc.

—specialists in engineering  
—production —finishing  
of copper-base alloy parts.

A-19

## WAREHOUSE PRICES

## PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
Philadelphia	\$3.518	\$4.872	\$4.768	\$3.922	\$4.772	\$3.605	\$3.666	\$3.822	\$4.172	\$5.818	\$8.988	\$7.072	\$8.172
New York	3.59	4.813	5.110	3.974	4.772	3.768	3.758	3.853	4.203	5.858	6.908	7.103	8.203
Boston	3.744	4.744	5.224	4.108	4.715	3.912	3.912	4.044	4.244	6.012	7.062	7.194	8.394
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.902	4.152	.....	.....	.....	.....
Norfolk	3.771	4.965	5.371	4.165	4.965	3.971	4.002	4.065	4.265	.....	.....	.....	.....
Chicago	3.25	4.20	5.231	3.60	4.651	3.55	3.55	3.50	3.85	5.60	6.65	6.65	7.90
Milwaukee	3.287	4.337	5.272	3.737	4.787	3.687	3.687	3.637	3.987	5.837	6.887	6.887	7.987
Cleveland	3.35	4.40	4.877	3.60	4.45	3.40	3.588	3.35	3.85	5.806	6.856	6.85	7.75
Buffalo	3.35	4.40	4.754	3.619	4.669	3.63	3.40	3.35	3.85	5.60	6.65	6.65	7.75
Detroit	3.45	4.50	5.004	3.70	4.654	3.609	3.601	3.45	3.90	5.93	6.98	6.959	8.059
Cincinnati	3.425	4.475	4.825	3.675	4.711	3.661	3.661	3.611	4.111	5.95	7.00	7.011	8.261
St. Louis	3.397	4.347	5.172	3.747	4.697	3.697	3.697	3.647	4.131	5.961	7.031	7.031	8.131
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.85	5.60	6.65	6.65	7.90
St. Paul	3.50	4.48	5.257	3.66	4.617	3.617	3.617	3.567	3.967	5.94	6.99	7.061	8.461
Omaha	3.685	5.443	5.608	4.215	4.165	4.165	4.165	4.115	4.543	.....	.....	.....	.....
Indianapolis	3.518	4.568	4.918	3.768	4.741	3.63	3.63	3.58	4.08	5.93	6.98	6.98	8.23
Birmingham	3.45	4.75	4.75	3.70	4.741	3.55	3.55	3.50	4.53	.....	.....	.....	.....
Memphis	3.667	4.66	5.265	4.215	4.095	4.095	4.095	4.015	4.53	.....	.....	.....	.....
New Orleans	4.058	5.079	5.358	4.308	4.198	4.198	4.198	4.108	4.729	.....	.....	.....	.....
Houston	3.763	5.573	5.313	4.313	4.25	4.25	4.25	4.15	4.725	7.223	8.323	8.323	9.373
Los Angeles	5.80	7.20	6.104	4.95	5.613	4.95	4.95	4.40	5.063	8.304	9.404	9.404	10.454
San Francisco	4.654	7.304	6.354	4.504	7.331	4.654	4.654	4.154	5.433	8.304	9.404	9.404	10.454
Seattle	4.653	7.054	5.954	4.253	4.753	4.513	4.513	4.353	5.053	8.304	9.404	9.404	10.454
Portland	4.651	6.604	5.754	4.751	4.851	4.511	4.511	4.411	5.033	8.304	9.404	8.304	9.404
Salt Lake City	4.5301	.....	8.1713	5.5317	.....	4.9817	4.9817	4.9817	8.00	.....	.....	.....	.....

## National Emergency Steels

## MILL EXTRAS

Designa- tion	Basic Open-Hearth		Electric Furnace		Designa- tion	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 8612	0.65	\$13.00	\$1.15	\$23.00	NE 9427	0.75	\$15.00	\$1.25	\$25.00
NE 8615	0.65	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00
NE 8617	0.65	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8620	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8622	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8625	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8627	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8630	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8632	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8635	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8637	0.65	13.00	1.15	23.00					
NE 8640	0.65	13.00	1.15	23.00	NE 9722	0.65	13.00	1.15	23.00
NE 8642	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8645	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8647	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
NE 8650	0.65	13.00	1.15	23.00	NE 9742	0.65	13.00	1.15	23.00
					NE 9745	0.65	13.00	1.15	23.00
NE 8712	0.70	14.00	1.20	24.00	NE 9747	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9750	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00	NE 9763	0.65	13.00	1.15	23.00
NE 8720	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00
NE 8722	0.70	14.00	1.20	24.00					
NE 8725	0.70	14.00	1.20	24.00	NE 9830	1.30	26.00	1.80	36.00
NE 8727	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9835	1.30	26.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 8747	0.70	14.00	1.20	24.00					
NE 8750	0.70	14.00	1.20	24.00	NE 9912	1.20	24.00	1.55	31.00
					NE 9915	1.20	24.00	1.55	31.00
NE 9415	0.75	15.00	1.25	25.00	NE 9917	1.20	24.00	1.55	31.00
NE 9417	0.75	15.00	1.25	25.00	NE 9920	1.20	24.00	1.55	31.00
NE 9420	0.75	15.00	1.25	25.00	NE 9922	1.20	24.00	1.55	31.00
NE 9422	0.75	15.00	1.25	25.00	NE 9925	1.20	24.00	1.55	31.00
NE 9425	0.75	15.00	1.25	25.00					

Note 1: The ranges shown are restricted to size 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, AISI Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and 55 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of \$2.70 for 100 lb. on finished products and \$54 per gross ton on semi-finished steel, major taxing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

## BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base.

NE ALLOY BARS: 1000 to 30,000 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(\*) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

\*Add 0.271c. for sizes not rolled in Birmingham.

\*\*City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

## LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports\*)

Per Gross Ton

Old range, bessemer, 51.50 ..... \$4.75

Old range, non-bessemer, 51.50 ..... 4.80

Mesa, bessemer, 51.50 ..... 4.80

Mesa, non-bessemer, 51.50 ..... 4.80

High phosphorus, 51.50 ..... 4.80

\*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

## FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

## Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluor spar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF<sub>2</sub> Content: Base price per short ton  
70% or more ..... \$33.00  
65% but less than 70% ..... 32.00  
60% but less than 65% ..... 31.00  
Less than 60% ..... 30.00

## PRICES

### WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills  
(F.o.b. Pittsburgh only on wrought pipe)  
base price—\$200.00 per net ton

#### Steel (butt weld)

	Black	Galv.
1/2-in. ....	63 1/2	61
3/4-in. ....	66 1/2	65
1-in. to 3-in. ....	68 1/2	67 1/2

#### Wrought Iron (butt weld)

1/2-in. ....	24	2 1/2
3/4-in. ....	30	10
1-in. and 1 1/4-in. ....	34	16
1 1/2-in. ....	38	18 1/2
2-in. ....	37 1/2	18

#### Steel (lap weld)

2-in. ....	61	49 1/2
2 1/2-in. and 3-in. ....	64	52 1/2
3 1/2-in. to 6-in. ....	66	54 1/2

#### Wrought Iron (lap weld)

2-in. ....	30 1/2	12
2 1/2-in. to 3 1/2-in. ....	31 1/2	14 1/2
4-in. ....	33 1/2	18
4 1/2-in. to 8-in. ....	32 1/2	17

#### Steel (butt, extra strong, plain ends)

1/2-in. ....	61 1/2	50 1/2
3/4-in. ....	65 1/2	54 1/2
1-in. to 3-in. ....	67	57

#### Wrought Iron (same as above)

1/2-in. ....	26	6
3/4-in. ....	31	12
1-in. to 2-in. ....	38	19 1/2

#### Steel (lap, extra strong, plain ends)

2-in. ....	59	48 1/2
2 1/2-in. and 3-in. ....	62	52 1/2
3 1/2-in. to 6-in. ....	66 1/2	56

#### Wrought Iron (same as above)

2-in. ....	33 1/2	15 1/2
2 1/2-in. to 4-in. ....	35	22 1/2
4 1/2-in. to 6-in. ....	37 1/2	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5 pct. On L.C.L. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

### CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago....	\$54.80
6-in. and larger, del'd New York..	52.20
6-in. and larger, Birmingham ....	46.00
6-in. and larger L.o.b. cars, San Francisco or Los Angeles.....	69.40
6-in. and larger L.o.b. cars, Seattle..	71.20
Class "A" and gas pipe, 33 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 300 tons. For 300 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect 3 pct tax on freight rates.	

### BOILER TUBES

Seamless steel and lap weld commercial boiler tubes and locomotive tubes. Minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots.

	Seamless	Lap-weld, Cold-Drawn	Hot-Drawn	Hot-Rolled
1 in. O.D. 13 B.W.G. ....	16.03	12.04	12.38	
2 1/2 in. O.D. 12 B.W.G. ....	20.21	17.54	16.58	
2 in. O.D. 12 B.W.G. ....	22.48	19.50	18.35	
2 1/2 in. O.D. 11 B.W.G. ....	28.37	24.42	23.15	
1 in. O.D. 10 B.W.G. ....	35.20	30.54	28.66	

(Extras for less carload quantities)

2,000 lb or ft and over .....	Base
2,000 lb or ft to 29,999 lb or ft .....	5 pct
2,000 lb or ft to 29,999 lb or ft .....	10 pct
2,000 lb or ft to 29,999 lb or ft .....	20 pct
2,000 lb or ft to 29,999 lb or ft .....	30 pct
2,000 lb or ft to 29,999 lb or ft .....	45 pct
Under 2,000 lb or ft .....	65 pct

Forming, Welding, Fabricating

Big Installations or Small Parts—  
**Call BRANDT of Baltimore**

for Precision in Heavy Plate and Sheet Steel Work

Here is an 8 1/2 acre plant . . . with the most modern equipment for shearing, rolling, forming, welding and completely fabricating ferrous, non-ferrous and alloy metals to your specifications . . . from the lightest gauge sheet up to and including 1 1/4" mild steel or 3/4" armor plate.

## Include BRANDT in Your Postwar Plans!

Whether you'll return to your old product, or enter an entirely new field after the war, you will more than likely need the services of an experienced metal-fabricating plant. That's where Brandt can help you!

The Brandt 8 1/2-acre plant houses the most modern equipment for shearing, rolling, forming, welding . . . completely fabricating ferrous, non-ferrous and alloy metals to your specifications. Machine capacities range from the lightest gauge sheet up to and including 1 1/4" mild steel or 3/4" armor plate. At the present time our production ranges from small, formed units to huge fabricated assemblies.

Our designers and engineers will welcome the opportunity to assist in planning the details and specifications of your product. Naturally your plans will be held in strictest confidence. So if there is a fabrication or design problem in your postwar plans, we invite you to discuss it with

## BRANDT of Baltimore

Charles T. Brandt, Inc., 1716 Ridgely Street  
Baltimore 30, Maryland



# A.I.S.I. HY-TEN S.A.E.

## ALLOY STEELS FOR RECONVERSION

To take advantage of up to the minute development in the metallurgy of steel before improvements can be incorporated in the natural course of events in standard steels, specify HY-TEN STEELS.

Immediate shipment from seven conveniently located stocks.

Data sheets gladly mailed on request.

"THE HY-TEN OF TODAY IS THE STANDARD STEEL OF TOMORROW"

### WHELOCK, LOVEJOY & CO., INC.

126 Sidney Street

Cambridge 39, Mass.

Cleveland 14 • Chicago 23 • Newark 5 • Detroit 3 • Buffalo 10 • Cincinnati 32

# Fast Tough



**Heavy feed at high speed spells doom to the ordinary hack saw blade; down-time for your machine, extra expense in money, man hours, and production. The MARVEL Hack Saw Blade, because it is positively unbreakable under these conditions, should be "a must" tool in every efficiently operated shop. A tough alloy steel back is electrically welded to high speed steel teeth, producing a blade that can be pulled to almost unlimited tension; can withstand extra heavy feeds and the heat and abrasion of high speed heavy duty sawing.**

**Heavy feed at high speed**



**The same exclusive unbreakable feature of MARVEL Hack Saws, giving these saws the ability to stand up under abuse. MARVEL Hole Saws cut holes from 5/8" to 4 1/2" diameter in stock up to 1 1/2" thick. Usable in portable drill, drill press, or lathe tail stock.**

**at high speed**

**Complete Range of Metal Sawing Machines**  
Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

**ARMSTRONG-BLUM MFG. CO.**  
5700 W. Bloomingdale Ave., Chicago 39, Illinois, U.S.A.

## PRICES

### Corrosion and Heat Resisting Steel

(Base price, cents per pound, at points indicated: P—Pittsburgh; Ch—Chicago; Cl—Cleveland; C—Canton; M—Middletown, O.; Sy—Syracuse; D—Dunkirk; W—Watervliet; N—Newark, N. J.; B—Baltimore; R—Reading; Y—Youngstown; F—Ft. Wayne; Ph—Philadelphia)

### Chromium-Nickel Alloys

	No. 304	No. 302
Ingot, P,Ch,C,B,R,F,Ph	Subject to negotiation	
Blooms, P,Ch,C,R,B,F,Ph	21.25	20.40
Slabs, P,Ch,C,B,R,Ph	21.25	20.40
Billets, P,Ch,C,N,W,Sy,B	Subject to negotiation	
Billets, forging, P,Ch,C,D,B,R,Ph,W,Sy,N,F	21.25	20.40
Bars, h-r, P,Ch,C,D,W,N,Sy,B,R,F,Ph	25.00	24.00
Bars, c-f, P,Ch,C,D,N,Sy,B,R,F,Ph,W	25.00	24.00
Plates, P,M,C,B	29.00	27.00
Shapes, structural, P,Ch	25.00	24.00
Sheets, P,Ch,M,C,B	36.00	34.00
Strip, h-r, P,Ch,R,C,Y	23.50	21.50
Strip, c-r, P,Ch,N,R,C,Y	30.00	28.00
Wire, c-d, Cl,D,Sy,B,R,C,P,N,Ph	25.00	24.00
Wire, flat, c-r, Cl,B,R,D,C	30.00	28.00
Rod, h-r, N,Sy	25.00	24.00
Tubing, seamless, P,Ch,C (4 in. to 6 in.)	66.63	66.63

### Straight Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
Ingot, P,Ch,C,B,R,F,Ph	Subject to negotiation			
Blooms, P,Ch,C,R,B,F,Ph	15.725	16.15	19.125	23.375
Slabs, P,Ch,C,B,R,Ph	15.725	16.15	19.125	23.375
Billets, P,Ch,C,N,W,Sy,B	Subject to negotiation			
Billets, forging, P,Ch,C,D,B,R,Ph,W,Sy,N,F	15.725	16.15	19.125	23.375
Bars, h-r, P,Ch,C,D,W,N,Sy,B,R,F,Ph	18.50	19.00	22.50	27.50
Bars, c-f, P,Ch,C,D,N,Sy,B,R,F,Ph,W	18.50	19.00	22.50	27.50
Plates, P,M,C,B	21.50	22.00	26.50	30.50
Shapes, structural, P,Ch	18.50	19.00	22.50	27.50
Sheets, P,Ch,M,C,B	26.50	29.00	32.50	36.50
Strip, h-r, P,Ch,R,Y,C	17.00	17.50	24.00	35.00
Strip, c-r, P,Ch,N,R,Y,C	22.00	22.50	32.00	52.00
Wire, c-d, Cl,D,Sy,B,R	18.50	19.00	22.50	27.50
Wire, flat, c-r, Cl,B,R	22.00	22.50	32.00	52.00
Rod, h-r, N,Sy	18.50	19.00	22.50	27.50
Tubing, seamless, P,Ch,C (4 in. to 6 in.)	63.30			

### Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00
Sheets	19.00
*Includes annealing and pickling.	

### EXCEPTIONS TO RPS 6

Ingot, carbon, rerolling—Phoenix Iron Co. may charge \$38.75; Kaiser Co. \$43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co. \$34.25; Pgh. Steel Co. \$33.10. Granite City Steel, \$39.45.

Ingot, carbon, forging—Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co. \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.09, f.o.b. Pacific Coast Ports; Pgh. Steel Co. \$38.10.

Ingot, alloy—C/I delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

Slabs, per gross ton—Andrews Steel Co. \$41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tinplate Corp. \$41; Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Granite City Steel \$47.50; Kaiser Co., (rerolling) \$58.64, (forging) \$64.64, f.o.b. Los Angeles.

Blooms, per gross ton—Phoenix Iron Co. (rerolling) \$41; (forging) \$47; Pgh. Steel Co. (rerolling) \$38.25, (forging) \$44.25; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) \$58.64, (forging) \$64.64 (shell steel) \$74.64 f.o.b. Los Angeles.

Sheet Bar, per gross ton—Empire Sheet & Tinplate Co. \$39 mill; Wheeling Steel Corp. \$38 Portsmouth, Ohio.

Billets, Forging, per gross ton—Andrews Steel Co. \$50 basing pts.; Follansbee Steel Corp. \$49.50 Toronto, Ohio; Phoenix Iron Co. \$47 mill; Geneva Steel Co. \$64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. \$49.50; Kaiser Co. \$64.64 (shell steel) \$74.64, f.o.b. Los Angeles.

# PRICES

**Billets, Hotrolling, per gross ton**—Continental Steel Corp. may charge Acme Steel in Chicago switching area \$34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) \$41 mill; Wheeling Steel Corp. 4 in. sq. or larger \$37.75, smaller \$39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at \$39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at \$39 base, f.o.b. Peoria; Phoenix Iron Co. \$41 mill; Continental Steel Corp. (1½ x 1½) \$39.50, (2 x 2) \$40.60 Kokomo, Ind. (these prices include \$1 size extra); Keystone Steel & Wire Co. \$36.40 Peoria; Connors Steel Co. \$50.60 Birmingham; Ford Motor Co. \$34 Dearborn Mich.; Geneva Steel Co. \$58.64 f.o.b. Pacific Coast; Pgh. Steel Co. \$43.50; Kaiser Co. \$58.64 f.o.b. Los Angeles.

**Structural Shapes**—Phoenix Iron Co. 2.50c basing pta. (export) 2.50c. Phoenixville, Knoxville Iron Co. 2.30c. basing points; Kaiser Co. 2.20c. f.o.b. Los Angeles.

**Rails, per gross ton**—Sweet Steel Co. (rail steel) \$50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron, \$45 Pueblo

**Hot Rolled Plate**—Granite City Steel Co. 2.85c. produced on DPC eqpt., 2.85c. otherwise; Knoxville Iron Co. 2.25c. basing pta. Kaiser Co. and Geneva Steel Co. 3.30c. Pacific Ports; Central Iron and Steel Co. 2.50c. basing points; Granite City Steel Co. 2.35c. Granite City.

**Merchant Bars**—W. Ames Co., 10 tons and over, 2.85c. mill; Eckels-Nye Steel Corp. 2.50c. basing pta. (rail steel) 2.40c.; Phoenix Iron Co. 2.40c. basing pta.; Sweet Steel Co. (rail steel) 2.35c. mill; Joslyn Mfg. & Supply Co. 2.35c. Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar), 2.35c. Chicago; Knoxville Iron Co., 2.30c. basing pta.; Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill.; Miltor Mfg. Co., 2.75c. f.o.b. Milton, Pa.

**Pipe Skelp**—Wheeling Steel, Benwood, 2.05c. Reinforcing Bars—W. Ames & Co., 10 tons and over, 2.85c. mill; Sweet Steel Co. (rail steel), 2.35c. mill; Columbia Steel Co., 2.50c. Pacific Ports.

**Cold Finished Bars**—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants, f.o.b. plant; Compressed Steel Shifting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass., f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

**Alley Bars**—Texas Steel Co., for delivery except Texas and Okla., Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co., shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

**Hot Rolled Strip**—Joslyn Mfg. & Supply Co., 2.30c. Chicago; Knoxville Iron Co., 2.25c. basing pta.

**Hot Rolled Sheets**—Andrews Steel Co., Middle town base on shipments to Detroit or area Parkersburg Iron & Steel, 2.25c. Parkersburg Granite City Steel 2.43c.

**Galvanized Sheets**—Andrews Steel Co. 3.75c. basing pta.; Parkersburg Iron & Steel Co. 3.85c. Parkersburg; Continental Steel Co. Middletown base on Kokomo, Ind., product Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

**Pipe and Tubing**—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

**Black Sheets**—Empire Sheet and Tinplate Co. maximum base price mill is 2.45c. per 100 lb. with differentials, transportation charges, etc. provided in RPS. No. 6.

**Wire Products**—Pittsburgh Steel Co., f.o.b. Pittsburgh, per 100 lb., rods, No. 5 to 9/32 in., 2.20c.; rods heavier than 9/32, 2.35c.; bright wire, 2.725c.; bright nails, 2.90c.; lead and furnace annealed wire, 2.85c.; pot annealed wire, 2.85c.; galvanized barbed wire, 3.0c.; plain staples, 2.55c.; galvanized staples, 2.85c.; bright spring wire, 3.30c.; galvanized spring wire, 3.45c.

## PERFORATED METALS

### INDUSTRIAL and ORNAMENTAL

To produce the highest quality of perforated metal as used in the industrial arts and for ornamentation has been the ambition and persistent endeavor of this company. The highest quality best serves the user. We are here to serve you.

ANY METAL • ANY PERFORATION

The **Harrington & King** PERFORATING CO.

5657 FILLMORE STREET—CHICAGO 44, ILL.  
Eastern Office, 114 Liberty Street, New York 6, N. Y.



## You Can Depend On "Hercules" (Red Strand) Wire Rope

### Highlights of Quality

1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods

• • Results are what count, and the performance record of this wire rope continues to make and hold friends.

Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

**A. LESCHEN & SONS ROPE CO.**

WIRE ROPE MAKERS

1909 KENNERLY AVENUE

ST. LOUIS, MISSOURI U.S.A.

NEW YORK  
CHICAGO  
DENVER

90 Wool Street  
810 W. Washington Blvd.  
1534 Wacoa Street



SAN FRANCISCO  
PORTLAND  
SEATTLE

520 Fourth Street  
914 N. W. 14th Avenue  
3410 First Avenue South

# PIG IRON PRICES

BASING POINT* BASE PRICES						DELIVERED PRICES† (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	\$25.50	\$26.00	\$26.50	\$27.00		Boston	Everett	\$ 5.50	\$26.00	\$26.50	\$27.00	\$27.50	
Birdsboro	25.50	26.00	26.50	27.00	\$30.50	Boston	Birdsboro-Steelton	4.02					\$34.52
Birmingham	20.00	21.35	22.00	22.50		Brooklyn	Bethlehem	2.50	26.00	26.50	27.00	27.50	
Buffalo	24.00	25.00	25.50	26.00	30.50	Brooklyn	Birdsboro	2.92					33.42
Chicago	24.50	25.00	25.50	26.00		Canton	Cleveland	1.35	25.50	26.00	26.50	27.00	
Cleveland	24.50	25.00	25.50	26.00		Canton	Buffalo	3.15					33.65
Detroit	24.50	25.00	25.50	26.00		Cincinnati	Birmingham	4.05	24.00	24.44			
Duluth	25.00	25.50	26.00	26.50		Cincinnati	Hamilton	1.11			26.11		
Erie	24.50	25.00	25.50	26.00		Cincinnati	Buffalo	4.40					34.90
Everett	25.50	26.00	26.50	27.00		Jersey City	Bethlehem	1.53	27.03	27.53	28.03	28.53	
Granite City	24.50	25.00	25.50	26.00		Jersey City	Birdsboro	1.94					32.44
Hamilton	24.50	25.00	25.50	26.00		Los Angeles	Provo	4.95	27.45	27.95			
Neville Island	24.50	25.00	25.50	26.00		Los Angeles	Buffalo	18.41					46.91
Provo	22.50	23.00				Mansfield	Cleveland & Toledo	1.94	26.44	26.94	27.44	27.94	
Sharpsville	24.50	25.00	25.50	26.00		Mansfield	Buffalo	3.35					33.55
Sparrows Point	25.50	26.00			30.50	Philadelphia	Swadeland	1.84	26.34	26.84	27.34	27.84	
Steelton	25.50					Philadelphia	Birdsboro	1.24					31.74
Swadeland	25.50	26.00	26.50	27.00		San Francisco	Provo	4.95	27.45	27.95			
Toledo	24.50	25.00	25.50	26.00		San Francisco	Buffalo	18.41					46.91
Youngstown	24.50	25.00	25.50	26.00		Seattle	Provo	4.95	27.45	27.95			
						Seattle	Buffalo	18.41					46.91
						St. Louis	Granite City	5.50	28.00	28.50	29.00	29.50	
						St. Louis	Buffalo	7.07					37.57

° Maximum per gross ton, established by OPA February 14, 1945.

† Prices do not reflect 3 per cent tax on freight.

\* Maximum per gross ton, established by OPA February 14, 1945.

† Prices do not reflect 3 per cent tax on freight.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, Bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, \$23.00 and \$24.00, respectively. Newberry Brand of Lake Superior charcoal iron \$39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10, April 11, 1945, retroactive to March 7, 1945. Delivered to Chicago, \$42.34. High phosphorus iron sells at Lyles, Tenn., at \$28.50.

Basing point prices are subject to switch-

ing charges: Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 35c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1945, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

Silvery iron and bessemer ferro-silicon up to and including 14.00 per cent silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 per cent, C/L per G.T., f.o.b. Jackson, Ohio—\$30.50; f.o.b. Buffalo—\$31.75. Add \$1.00 per ton for each additional 0.50% Si. Add 50c. per ton for each 0.50% Mn over 1.00%. Add \$1.00 per ton for 0.75% or more P. Bessemer ferro-silicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

## METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c per lb, ton lots.

Copper, electrolytic, 150 and 300 mesh ..... 21 1/2¢ to 23 1/2¢

Copper, reduced, 150 and 300 mesh ..... 30 1/2¢ to 35 1/2¢

Iron, commercial, 100 and 200 mesh 96 + % Fe ..... 12 1/2¢ to 15 1/2¢

Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots ..... 4¢

Iron, hydrogen reduced, 300 mesh and finer, 98 1/2 + % Fe, drum lots ..... 63¢

Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe 30 to 33¢

Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe ..... 43¢

Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe ..... 90¢

Aluminum, 100 and 200 mesh ..... 35¢

Antimony, 100 mesh ..... 30¢

Cadmium, 100 mesh ..... \$1.40

Chromium, 100 mesh and finer ..... \$1.25

Lead, 100, 200 & 300 mesh ..... 11 1/2¢ to 15¢

Manganese ..... 65¢

Nickel, 150 mesh ..... 51 1/2¢

Solder powder, 100 mesh, 3 1/2¢ plus metal

Tin, 100 mesh ..... 58¢

Tungsten metal powder, 98% 99%, any quantity, per lb ..... \$2.50

Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb. \$2.50

Under 100 lb ..... \$2.00

\*Freight allowed east of Mississippi.

## COKE

Furnace, beehive (f.o.b. even)	Net Ton
Connellsville, Pa.	\$7.50*
Foundry, beehive (f.o.b. even)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, By-Product	
Chicago, del'd	13.75
Chicago, f.o.b.	13.00
New England, del'd	14.65
Kearny, N. J., f.o.b.	13.05
Philadelphia, del'd	13.25
Buffalo, del'd	13.40
Portsmouth, Ohio, f.o.b.	11.50
Painesville, Ohio, f.o.b.	12.15
Erie, del'd	13.15
Cleveland, del'd	13.30
Cincinnati, del'd	13.25
St. Louis, del'd	14.25
Birmingham, del'd	10.90

\* Hand drawn ovens using trucked coal permitted to charge \$8.50 per ton plus transportation charges.

# C-F POSITIONERS

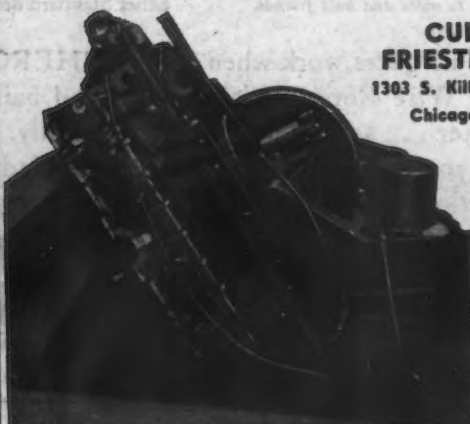
... cut welding time and cost on heavy gear cases.

This special installation of a 14,000 lbs. capacity C-F Positioner allows all the welding on two large units in a downhand position and with a single set-up! Two units are mounted together with the positioner extended over a pit. The long weldments can then swing from horizontal to 135°, and can be rotated 360° with variable speeds from 0 r.p.m. up. The need for a "strongback" is eliminated and ample floor space and headroom under cranes assured.

C-F Positioners and installation technique can cut your welding time and cost. Capacities from small hand operated positioners to large units handling 30,000 lbs., are available.

Write for Bulletin WP-22

**CULLEN-FRIESTEDT CO.**  
1303 S. Kilbourn Avenue  
Chicago 23, Ill.



Photos courtesy  
Foster  
Birmingham  
Co., Inc.

## PRICES

### BOLTS, NUTS, RIVETS, SET SCREWS

#### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

#### Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
1/2 in. & smaller x 6 in. & shorter	65 1/2
9/16 & 5/8 in. x 6 in. & shorter	63 1/2
3/4 to 1 in. x 6 in. & shorter	61
1 1/4 in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

#### Nuts, Cold Punched or Hot Pressed (Hexagon or Square)

1/2 in. and smaller	62
9/16 to 1 in. inclusive	59
1 1/4 to 1 1/2 in. inclusive	57
1 1/2 in. and larger	56
On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allow- ance for carload shipments.	

#### Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

Base discount less keg lots

7/16 in. and smaller	64
1/2 in. and smaller	62
3/4 in. through 1 in.	60
9/16 in. through 1 in.	59
1 1/4 in. through 1 1/2 in.	57
1 1/2 in. and larger	56
In full keg lots, 10 per cent additional discount.	

#### Stove Bolts

Consumer

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80
On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chi- cago, New York on lots of 200 lb. or over.	

#### Large Rivets

(1/2 in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chi- cago, Birmingham	\$3.75
--	--------

#### Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5
--	----------

#### Cap and Set Screws Consumer

Per Cent Off List

Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Mill studs	46
Flat head cap screws, listed sizes	36
Washer head cap, listed sizes	61
Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.	

### ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

20x14 in. 20x28 in.

8-lb. coating I.C.	\$6.00	\$12.00
5-lb. coating I.C.	7.00	14.00
0-lb. coating I.C.	7.50	15.00

### ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

Per Lb.

Field grade	3.30c.
Armature	3.65c.
Electrical	4.15c.
Motor	5.05c.
Dynamo	5.75c.
Transformer 72	6.25c.
Transformer 65	7.25c.
Transformer 58	7.75c.
Transformer 52	8.55c.
F.o.b. Granite City, add 10c. per 100 on field grade to and including dynamo. Pacific ports add 75c. per 100 on all grades.	



For nearly forty years—through peace and war times—King has supplied metal rings and flanges to industry. And throughout that period, the name "King" has been synonymous with highest quality materials, craftsmanship, dependability. Rolled hot or cold from bar stock steel or non-ferrous metals, King Rings and Flanges are true to size, perfectly welded, smooth-finished.

Variety and versatility are seldom found in the equipment of a maker of rings and flanges. But these attributes characterize the King organization. Unusual dimensions, peculiar shapes, the ability to work with company engineers along unprecedented lines—these are qualities you will find at King.

A Flat Flange C Leg-out Angle Ring  
B Band Ring D Leg-in Angle Ring

## KING FIFTH WHEEL COMPANY

2917 N. SECOND STREET, PHILADELPHIA 33, PA.

# OHIO SHEARS

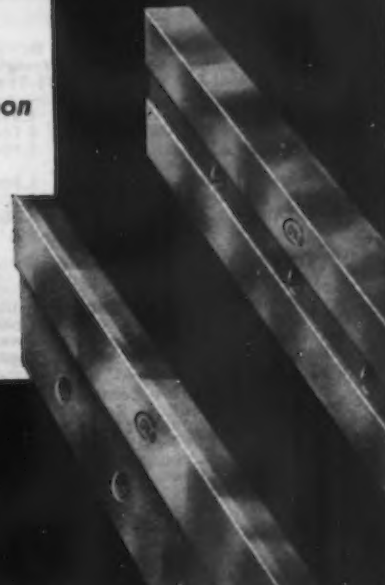
SOLID STEEL—all grades

LAID STEEL—hi-speed and carbon

ROTARY SHEARS and SLITTERS

The OHIO KNIFE Co.

CINCINNATI 23,  
OHIO



# FERROALLOY PRICES

## Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn. Carload lots (bulk) ..... \$135.00 Carload lots (packed) ..... 141.00 Less ton lots (packed) ..... 148.50 \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

## Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.  
96-98% Mn, 2% max. C, 1% max. Si, 2% max. Fe.  
Carload, bulk ..... 32c.  
L.c.l. lots ..... 34c.

## Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.  
16-19% Mn 19-21% Mn  
3% max. Si 3% max. Si  
Carloads ..... \$35.00 \$36.00  
Less ton ..... 47.50 48.50

## Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

	Eastern Zone	Central Zone	Western Zone
50% Si ...	6.65c.	7.10c.	7.25c.
75% Si ...	8.05c.	8.20c.	8.75c.
80-90% Si ...	8.90c.	9.05c.	9.50c.
90-95% Si ...	11.05c.	11.20c.	11.65c.

Spot sales add: 45c. per lb. for 50% Si, 3c. per lb. for 75% Si, 35c. per lb. for 80-90% and 90-95% Si.

## Silvery Iron

Silvery Iron, Silicon 14.01 to 14.50 per cent, \$45.50 per G. T. f.o.b. Jackson, Ohio. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for low impurities, not to exceed: P-0.05%, S-0.04%, C-1.00%. Covered by MPR 405.

## Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe...	12.10c.	13.55c.	16.50c.
97% Si, 1% Fe...	13.45c.	13.90c.	16.80c.

## Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk...	3.35c.	3.50c.	3.65c.
2000 lb. carload...	3.8c.	4.2c.	4.25c.

## Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.  
Carload, bulk ..... 6.05c.  
2000 lb. to carload ..... 6.70c.  
Under 2000 lb. .... 6.90c.  
Briquets, contract, basis carlots, bulk freight allowed, per lb. .... 5.80c.  
2000 lb. to carload ..... 6.30c.  
Less ton lots ..... 6.55c.

## Ferrochrome

(65-72% Cr, 2% max. Si)

OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C .....	23.00c.	23.40c.	24.00c.
0.10% C .....	22.50c.	22.90c.	23.50c.
0.15% C .....	22.00c.	22.40c.	23.00c.
0.20% C .....	21.50c.	21.90c.	22.50c.
0.50% C .....	21.00c.	21.40c.	22.00c.
1.00% C .....	20.50c.	20.90c.	21.50c.
2.00% C .....	19.50c.	19.90c.	21.00c.
66-71% Cr, 4-10% C .....	13.00c.	13.40c.	14.00c.
62-66% Cr, 5-7% C .....	13.50c.	13.90c.	14.50c.

## High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

## Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

	Carloads, Ton	Bulk	Less Ton
0.10% max. C, 1 or 2% max. Si...	23.00c.	23.40c.	23.65c.
0.15% max. C, 1 or 2% max. Si...	22.00c.	22.40c.	22.65c.
0.30% max. C, 1 or 2% max. Si...	21.00c.	21.40c.	21.65c.
0.50% max. C, 1 or 2% max. Si...	20.00c.	20.40c.	20.65c.
0.75% max. C, 7.00% max. Si...	16.00c.	16.40c.	16.65c.

## Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk...	8.25c.	8.55c.	8.95c.
Ton lots .....	8.75c.	9.25c.	10.75c.
Less ton lots...	9.00c.	9.50c.	11.00c.

## Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk...	6.05c.	6.30c.	6.60c.
Ton lots .....	6.65c.	7.55c.	8.55c.
Less ton lots...	6.80c.	7.80c.	8.80c.

## Calcium-Manganese-Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca,	14-18% Mn,	53-59% Si
Add 0.25c. for	spot sales.	
	Eastern	Central Western
	Zone	Zone Zone
Carloads .....	15.50c.	16.00c. 18.05c.
Ton lots .....	16.50c.	17.35c. 19.10c.
Less ton lots	17.00c.	17.35c. 19.60c.

## Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

	Cast	Turnings	Distilled
Ton lots .....	\$1.80	\$2.30	\$5.00
Less ton lots...	2.30	2.80	5.75

## Chromium-Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.  
Shot or ingot ..... 45c.

## Ferroboreon

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots .....	\$1.20	\$1.2075	\$1.229
Less ton lots...	1.30	1.3075	1.329

## Manganese-Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales. 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots .....	\$1.89	\$1.902	\$1.935
Less ton lots...	2.01	2.023	2.055

## Nickel-Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern Zone	Central Zone	Western Zone
11,200 lb. or more ...	\$1.90	\$1.9125	\$1.9445
Ton lots .....	2.00	2.09125	2.0445
Less ton lots...	2.10	2.1125	2.1445

## Other Ferroalloys

Ferrotungsten, Standard grade lump or 1/4X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa. York, Pa., per lb. contained tungsten, 10,000 lb. or more.... \$1.90

Ferrovandium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.

Open hearth .....	\$2.70
Crucible .....	\$2.80
Primos .....	\$2.90

Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal..... \$1.50

Vanadium pentoxide, 88-92% V<sub>2</sub>O<sub>5</sub> technical grade, contract basis, any quantity, per lb. contained V<sub>2</sub>O<sub>5</sub>. Spot sales add 5c. per lb. contained V<sub>2</sub>O<sub>5</sub>..... \$1.10

Silicaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)  
Carload lots ..... 25c.  
2000 lb. to carload..... 26c.

Silicaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)  
Carload lots ..... 58c.  
2000 lb. to carload..... 59c.

Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis  
No. 1 ..... 87.5c.  
No. 6 ..... 60c.  
No. 79 ..... 45c.

Borfram, f.o.b. Niagara Falls  
Ton lots, per lb..... 45c.  
Less ton lots, per lb..... 50c.

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.  
2000 lb. lots ..... \$2.25  
Under 2000 lb. lots..... \$2.30

Ferrotitanium, 40-45%, 0.10% C max, f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti... \$1.23  
Less ton lots..... \$1.28

Ferrotitanium, 20-25%, 0.10% C max, ton lots, per lb. contained titanium ..... \$1.25  
Less ton lots..... \$1.40

High-carbon ferrotitanium, 15-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y. freight allowed East of Mississippi River, north of Baltimore and St. Louis, per carload..... \$142.50

Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton..... 58.50

Ferrophosphorus, electrolytic 23-26% carlots, f.o.b. Monsanto (Sigio), Tenn., \$3 unitage freight equalized with Nashville, per gross ton ..... \$75.00

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo. 95c.

Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo. .... 80c.

Molybdenum oxide briquets, 48-52% Mo. f.o.b. Langeloth, Pa. per lb. contained Mo. .... 80c.

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa. per lb. contained Mo. .... 80c.

Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 1/4c. for spot sales

Carload lots ..... 14c.  
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy  
Carload, bulk ..... 4.6c.

Alseifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk ..... 5.75c.  
Ton lots ..... 7.25c.

Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.  
Car lots ..... 8.00c.  
Ton lots ..... 8.75c.  
Less ton lots ..... 9.25c.